DRINKING WATER BOARD
PACKET

JANUARY 14, 2009

SALT LAKE CITY, UTAH

AGENDA

FOR THE

DRINKING WATER BOARD MEETING

OF

JANUARY 14, 2009

State of Utah
JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

DRINKING WATER BOARD MEETING

JANUARY 14, 2009
12:00 p.m.

Place: DEQ's Offices
168 North 1950 West, Room 101
Salt Lake City, Utah 84116

Ken Bousfield's Cell Phone #: (80l) 674-2557

1. Call to Order – Chairman Erickson

2. Roll Call – Ken Bousfield

3. Introductions – Chairman Erickson

4. Approval of Minutes – November 12, 2008

5. Arsenic Exemption Public Hearing

6. SRF/Conservation Committee Report – Vice Chairman Myron Bateman
   1) Status Report – Ken Wilde
   2) Project Priority List – Ken Wilde
   3) SRF Applications
      a) Discussion on Interest & the Hardship Grant Assessment – Ken Wilde
      b) St. George City – Michael Grange
      c) Blanding City – Planning – Rich Peterson
      d) Tridell LaPoint – Planning – Gary Kobzeff
      e) Veyo Culinary Water Association – Planning – Gary Kobzeff
      f) Kingston Town – Rich Peterson
      g) Hyde Park – Julie Cobleigh
      h) Corinne City – Jesse Johnson
      i) Hinckley Town Report – Ken Wilde
   4) Consideration on Name Change – Ken Wilde

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7. 2009 Approved Drinking Water Board Meeting Schedule

8. Rules R309-700 and 705: Set Rule Effective Date – Ken Wilde

9. Proposed Rule Amendments to: Rule R309-800 – Michael Grange

10. Proposed Substantive Rule Amendments – Bill Birkes and Bob Hart

    a) R309-500-6(3)(b) - Waiting of Plan Submittal Requirement
    b) R309-510-5 - Reduction of Sizing Requirement
    c) R309-520-11 - Ozone Reference
    d) R309-525-11(b)(c)(v) - Day Tank Drain Requirements
    e) R309-530-6(5)(c) - Filtration Rate Range
    f) R309-545-15(1) and (2) – Storage Tank Vent Design

11. Informational Discussion on Source, Storage, and the Instantaneous Demand for Irrigation in Drinking Water Regulations R309-510-7(3) and How it Differs from Water Rights - Bill Birkes

12. Status of Alta's Antimony Treatment Plant – Ken Bousfield

13. Rural Water Association's 2009 Annual Conference

14. Utah Water Users' 2009 Annual Conference

15. Rural Water Association of Utah Report

16. Letters

17. Chairman's Report – Chairman Erickson

18. Directors Report
    a) Division Staff On-the-Spot Awards
    b) Status Report on the Congressional Economic Recovery Appropriation

19. Next Board Meeting:
    Date: March 5, 2009
    Time of Board Meeting: 2:00 p.m.
    Location: Dixie Convention Center
    1835 Convention Center Drive, (Garden Room)
    St. George, Utah 84770

20. Other

21. Adjourn

In compliance with the American Disabilities Act, individuals with special needs (including auxiliary communicative aids and services) should contact Brooke Baker, Office of Human Resources at: (801) 536-4412, TDD (801) 536-4424, at least five working days prior to the scheduled meeting.

6. 3) SRF APPLICATIONS
h) Corinne City
- Jesse Johnson

Corinne City
Presented to the Drinking Water Board
January 14, 2009

DRINKING WATER BOARD
BOARD PACKET FOR CONSTRUCTION LOAN AUTHORIZATION

APPLICANT'S REQUEST

Corinne City is requesting $3,632,750 in financial assistance to construct a 1 MG concrete storage tank and replace 16,200 feet of 20 inch transmission line and 1,900 feet of 14 inch water line. The new storage tank is needed to increase the water system's storage capacity. The transmission and water lines are needed to replace inadequate existing pipes and improve pressure loss issues. Total project cost is estimated to be $3,953,170 and Corinne has committed to providing $20,420 to the project with another $300,000 anticipated from a Community Development Block Grant (C.D.B.G.).

STAFF COMMENTS AND RECOMENDATION:

Based on rate and connection information supplied by the water system, the current average water bill is $28.74 per month, which is equal to 0.79% of the local MAGI of $36,886. For the city's requested funding package, consisting of 100% construction loan with 21.8% principal forgiveness, the system's estimated average monthly water bill after project completion will be $76.24 or 2.48% of local MAGI. Several options were then explored to find a package that the residents of Corinne could more readily afford.

The calculated assessment fee for the loan is 2.89% per annum. **Staff proposed an assessment fee buy-down of 1.09%**, bringing the rate to 1.80% per annum. This is to aid the City in reducing their monthly cost-per-connection to near 1.75% of the MAGI.

Staff also proposed an adjusted principle payment schedule to reduce their initial financial obligations due to the size of the City. With an average expected growth rate of 2.5% obtained from the Governor's Office of Planning and Budget, the population would be able to handle larger payments in the future. By employing a lower assessment fee and an adjusted principle payment schedule, the average monthly water bill would be $56.25 (1.83% of the MAGI) for the first 10 years and $61.25 (1.99% of the MAGI) for the remainder of the loan.

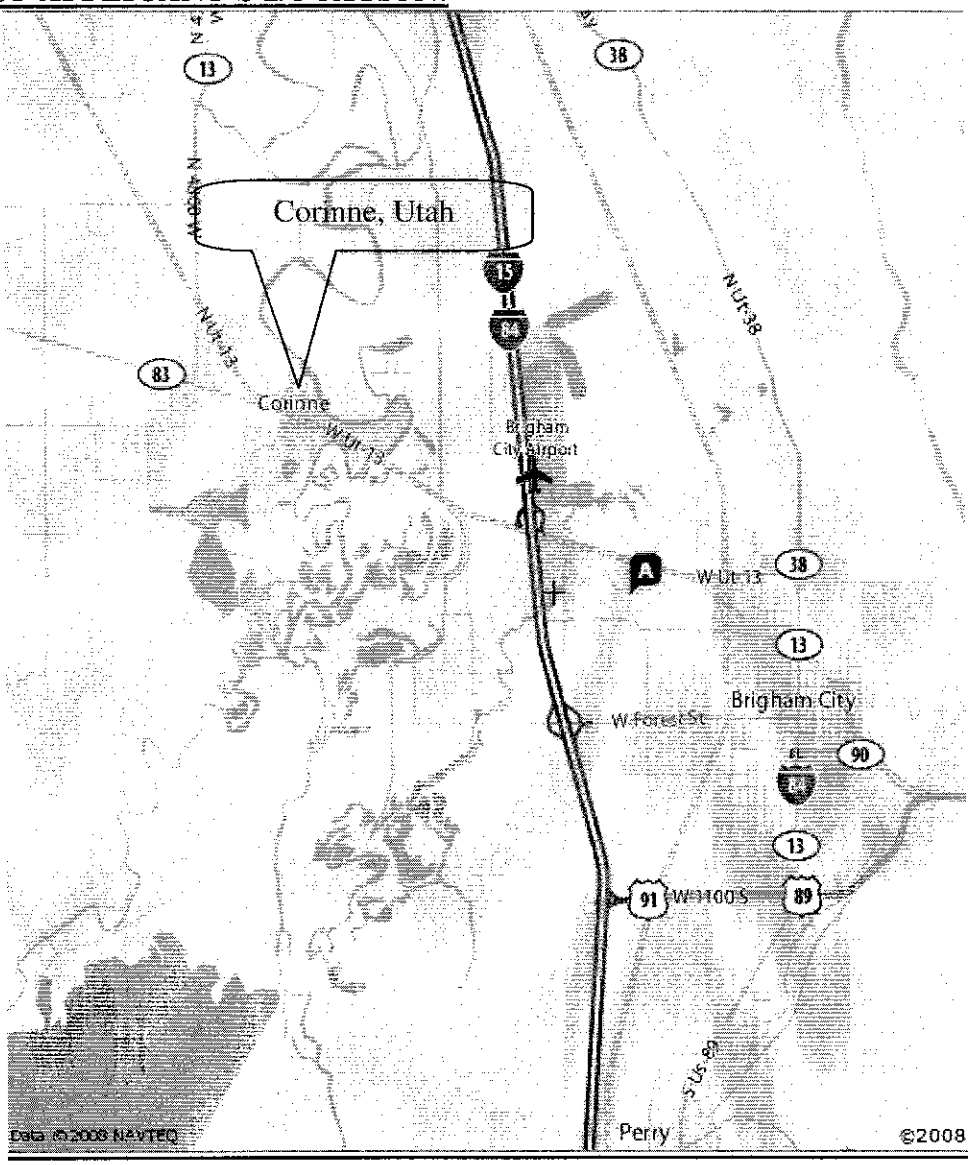
SRF CONSERVATION COMMITTEE RECOMMENDS:

The Drinking Water Board authorize a $3,632,750 construction loan with $790,570 (21.8%) principle forgiveness to Corinne City with a 1.80% Hardship Grant Assessment per annum for 30 years to be paid into the Hardship Grant Fund. The Committee also recommends that the principle payments be adjusted according to the attached schedule with lower initial payments that would increase over the life of the loan. A 1% loan origination fee of $28,420 will be assessed, which either can be absorbed by the authorized loan amount or paid by the City, out of city funds at loan closing.

APPLICANT'S LOCATION:

Corinne City is located in Box Elder County, approximately 6 miles northwest of Brigham City.

MAP OF APPLICANT'S LOCATION:



POSITION ON PROJECT PRIORITY LIST:

Corinne City has 16.8 points on the priority list.

PROJECT DESCRIPTION:

Construct a 1,000,000 gallon concrete culinary water storage tank. Corinne City also will replace approximately 16,200 feet of deteriorating, 6-inch transmission line with 20" PVC pipe, and add approximately 1,900 feet of 14-inch water line.

ALTERNATIVES CONSIDERED:

Different line sizes were considered. The line sizes chosen were to allow for the least amount of pressure loss, since the storage tank is several miles outside the city.

The city is also considering reducing the amount of loan, removing the storage tank portion of the project, and only work on the transmission lines. They would then apply for assistance from Rural Development to complete the storage tank. This has been discussed briefly with the city and engineer.

POPULATION GROWTH:

There are no growth data specific to the Corinne area. However, according to the Governor's Office of Planning and Budget, Box Elder County in general is expected to grow at an average annual rate of change of 2.5% through 2030. The Engineer has anticipated an average annual rate of change of 3% through 2030. All cost analyses have been performed using the estimated rate of change of 2.5%.

	Year	Population	ERC's
Current	2006	683	282
Projected (G.O.P.B.)	2030	1,235	462
Projected (Engineer)	2030	1,309	515

IMPLEMENTATION SCHEDULE:

Apply to DWB for Funding:	October 2008
DWB Funding Authorization:	January 2009
Plans Submitted:	June 2009
Plan Approval:	July 2009
Advertise for Bids:	July 2009
Bid Opening:	August 2009
Loan Closing:	August 2009
Begin Construction:	September 2009
Complete Construction:	July 2010

COST ESTIMATE:

Construction:	$2,635,000
Engineering:	524,000
Contingency:	$658,750
Legal/Bonding:	$50,000
Administrative:	$57,000
DDW Loan Origination Fee:	28,420
Total Capital Cost:	$3,953,170

COST ALLOCATION:

Funding Source	Cost Sharing	Percent of Project
DWB Loan (1.8%, 30 yrs)	$2,842,000	71.89%
DWB Principal Forgiveness	$790,750	20.00%
C.D.B.G	$300,000	7.59%
Corinne Contribution	$20,420	0.52%
Total Amount:	$3,953,170	100.00%

ESTIMATED ANNUAL COST OF WATER SERVICE:

Operation & Maintenance:	$68,290
Other Debt Service	$52,168.75
DDW Debt Service (1.8%, 30 yrs):	$123,432
DDW 10% Coverage:	$12,343
DDW 15% partial coverage:	$18,515
Total Annual Cost / ERU:	$866.01
Monthly Cost / ERU:	$72.17
Avg. Cost w/ Irrigation	$78.42
Cost as % of MAGI:	2.55%

CONTACT INFORMATION:

APPLICANT:	Corinne City Water 2420 N 4000 W Corinne, UT 84307 435-744-5566
PRESIDING OFFICIAL & CONTACT PERSON:	Richard Nimori, Mayor 2420 N 4000 W Corinne, UT 84307 435-744-5566
CONSULTING ENGINEER:	Greg Seegmiller J-U-B Engineers Inc 466 North 900 West Kaysville, UT 84037 801-547-0393
CITY ATTORNEY:	Craig Smith Smith Halverson 215 South State Street, Ste. 650 SLC, UT 84111 801-413-1600
BOND ATTORNEY:	None Appointed
FINANCIAL CONSULTANT:	J-U-B Engineers Inc 466 North 900 West Kaysville, UT 84037 801-547-0393

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Corinne City
COUNTY: Box Elder
PROJECT DESCRIPTION: New tank and transmission line

FUNDING SOURCE: Federal SRF

78.2 % Loan & 21.8 % P.F.

ESTIMATED POPULATION:	695	NO. OF CONNECTIONS:	303	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$28.74 *			PROJECT TOTAL:	$3,953,170
CURRENT % OF AGI:	0.93%	FINANCIAL PTS:	57	LOAN AMOUNT:	$2,842,000
ESTIMATED MEDIAN AGI:	$36,886			PRINC. FORGIVENESS:	$790,750
STATE AGI:	$36,960			TOTAL REQUEST:	$3,632,750
SYSTEM % OF STATE AGI:	100%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 5.56%		AFTER REPAYMENT PENALTY & POINTS 1.80%
ASSUMED LENGTH OF DEBT, YRS:	30	30		30
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	5.56%		1.80%
REQUIRED DEBT SERVICE:	$94,733.33	$196,842.53		$123,432.13
*PARTIAL COVERAGE (15%):	$14,210.00	$29,526.38		$18,514.82
*ADD. COVERAGE AND RESERVE (10%):	$9,473.33	$19,684.25		$12,343.21
ANNUAL DEBT PER CONNECTION:	$390.81	$812.06		$509.21
O & M + FUNDED DEPRECIATION:	$68,290.00	$68,290.00		$68,290.00
OTHER DEBT + COVERAGE:	$52,168.75	$52,168.75		$52,168.75
REPLACEMENT RESERVE ACCOUNT:	$0.00	$0.00		$0.00
NEEDED SYSTEM INCOME:	$100,194.75	$100,194.75		$100,194.75
ANNUAL O&M PER CONNECTION:	$330.68	$330.68		$330.68
AVG MONTHLY WATER BILL:	$66.37	$101.48		$76.24
% OF ADJUSTED GROSS INCOME:	2.16%	3.30%		2.48%

* Current water bill is based on 2008 Revenue & number of connections

Corinne City

PROPOSED BOND REPAYMENT SCHEDULE

78.2 % Loan & 21.8 % P.F.

PRINCIPAL	$2,842,000.00	ANTICIPATED CLOSING DATE	26-Mar-09
INTEREST	1.80%	P&I PAYMT DUE	01-Jan-11
TERM	30	REVENUE BOND	
NOMIN. PAYMENT	$123,432.13	PRINC PREPAID:	$0.00

YEAR	BEGINNING BALANCE	DATE OF PAYMENT	PAYMENT		PRINCIPAL	INTEREST	ENDING BALANCE	PAYM NO.
2010	$2,842,000.00		$39,077.50	*	$0.00	$39,077.50	$2,842,000.00	0
2011	$2,842,000.00		$58,156.00		$7,000.00	$51,156.00	$2,835,000.00	1
2012	$2,835,000.00		$61,030.00		$10,000.00	$51,030.00	$2,825,000.00	2
2013	$2,825,000.00		$63,850.00		$13,000.00	$50,850.00	$2,812,000.00	3
2014	$2,812,000.00		$67,616.00		$17,000.00	$50,616.00	$2,795,000.00	4
2015	$2,795,000.00		$70,310.00		$20,000.00	$50,310.00	$2,775,000.00	5
2016	$2,775,000.00		$73,950.00		$24,000.00	$49,950.00	$2,751,000.00	6
2017	$2,751,000.00		$77,518.00		$28,000.00	$49,518.00	$2,723,000.00	7
2018	$2,723,000.00		$81,014.00		$32,000.00	$49,014.00	$2,691,000.00	8
2019	$2,691,000.00		$84,438.00		$36,000.00	$48,438.00	$2,655,000.00	9
2020	$2,655,000.00		$92,790.00		$45,000.00	$47,790.00	$2,610,000.00	10
2021	$2,610,000.00		$111,980.00		$65,000.00	$46,980.00	$2,545,000.00	11
2022	$2,545,000.00		$117,810.00		$72,000.00	$45,810.00	$2,473,000.00	12
2023	$2,473,000.00		$122,514.00		$78,000.00	$44,514.00	$2,395,000.00	13
2024	$2,395,000.00		$125,110.00		$82,000.00	$43,110.00	$2,313,000.00	14
2025	$2,313,000.00		$132,634.00		$91,000.00	$41,634.00	$2,222,000.00	15
2026	$2,222,000.00		$134,996.00		$95,000.00	$39,996.00	$2,127,000.00	16
2027	$2,127,000.00		$143,286.00		$105,000.00	$38,286.00	$2,022,000.00	17
2028	$2,022,000.00		$150,396.00		$114,000.00	$36,396.00	$1,908,000.00	18
2029	$1,908,000.00		$153,344.00		$119,000.00	$34,344.00	$1,789,000.00	19
2030	$1,789,000.00		$161,202.00		$129,000.00	$32,202.00	$1,660,000.00	20
2031	$1,660,000.00		$162,880.00		$133,000.00	$29,880.00	$1,527,000.00	21
2032	$1,527,000.00		$175,486.00		$148,000.00	$27,486.00	$1,379,000.00	22
2033	$1,379,000.00		$176,822.00		$152,000.00	$24,822.00	$1,227,000.00	23
2034	$1,227,000.00		$183,086.00		$161,000.00	$22,086.00	$1,066,000.00	24
2035	$1,066,000.00		$189,188.00		$170,000.00	$19,188.00	$896,000.00	25
2036	$896,000.00		$189,128.00		$173,000.00	$16,128.00	$723,000.00	26
2037	$723,000.00		$189,014.00		$176,000.00	$13,014.00	$547,000.00	27
2038	$547,000.00		$188,846.00		$179,000.00	$9,846.00	$368,000.00	28
2039	$368,000.00		$188,624.00		$182,000.00	$6,624.00	$186,000.00	29
2040	$186,000.00		$189,348.00		$186,000.00	$3,348.00	$0.00	30
			$3,955,443.50		$2,842,000.00	$1,113,443.50		

*Interest Only Payment

Corinne City

DWB Loan Terms		
Local Share (total):	$	20,420
Other Agency Funding:	$	300,000
DWB Grant Amount:	$	790,750
DWB Loan Amount:	$	2,842,000
DWB Loan Term:		30
DWB Loan Interest:		1.80%
DWB Loan Payment:	$	123,432

DW Expenses (Estimated)		
Proposed Facility Capital Cost:	$	3,981,590
Existing Facility O&M Expense:	$	68,290
Proposed Facility O&M Expense:	$	68,290
O&M Inflation Factor:		1.0%
Existing Debt Service:	$	41,735

DW Revenue Sources (Projected)		
Beginning Cash:	$	-
Existing Customers (ERC):		303
Projected Growth Rate:		2.5%
Impact Fee/Connection Fee:	$	2,533
Current Monthly User Charge:	$	22.49
Water Bill for years 1-5	$	50.00
Water Bill for years 6-10	$	50.00
Water Bill for years 11-15	$	55.00
Water Bill for years 16-30	$	55.00

DW Revenue Projections

Yr	Growth Rate (%)	Annual Growth (ERC)	Total Users (ERC)	User Charge Revenue	Impact Fee Revenue	Total Revenue	DWB Loan Repayment	DWB Loan Reserves	Remaining Principal	Principal Payment	Interest Payment	Existing DW Debt Service	O&M Expenses	Total Expenses	Service Ratio
0	2.5%	8	303	81,761	20,264	102,025	-	-	2,842,000	-	39,078	41,735	68,290	110,025	-
1	2.5%	8	311	186,600	20,264	206,864	**58,156**	**12,343**	2,835,000	7,000	51,156	41,735	68,290	180,524	1.39
2	2.5%	7	318	190,800	17,731	208,531	**61,030**	**12,343**	2,825,000	10,000	51,030	41,735	68,973	184,081	1.36
3	2.5%	8	326	195,600	20,264	215,864	**63,850**	**12,343**	2,812,000	13,000	50,850	41,735	69,663	187,591	1.38
4	2.5%	8	334	200,400	20,264	220,664	**67,616**	**12,343**	2,795,000	17,000	50,616	41,735	70,359	192,053	1.37
5	2.5%	9	343	205,800	22,797	228,597	**70,310**	**12,343**	2,775,000	20,000	50,310	41,735	71,063	195,451	1.41
6	2.5%	8	351	210,600	20,264	230,864	**73,950**	**12,343**	2,751,000	24,000	49,950	41,735	71,773	199,802	1.38
7	2.5%	9	360	216,000	22,797	238,797	**77,518**	**12,343**	2,723,000	28,000	49,518	41,735	72,491	204,087	1.39
8	2.5%	9	369	221,400	22,797	244,197	**81,014**	**12,343**	2,691,000	32,000	49,014	41,735	73,216	208,308	1.39
9	2.5%	9	378	226,800	22,797	249,597	**84,438**	**12,343**	2,655,000	36,000	48,438	41,735	73,948	212,464	1.39
10	2.5%	10	388	232,800	25,330	258,130	**92,790**	**12,343**	2,610,000	45,000	47,790	41,735	74,688	221,556	1.36
11	2.5%	10	398	262,680	25,330	288,010	**111,980**	**12,343**	2,545,000	65,000	46,980	41,735	75,435	241,493	1.38
12	2.5%	10	408	269,280	25,330	294,610	**117,810**	**12,343**	2,473,000	72,000	45,810	41,735	76,189	248,077	1.37
13	2.5%	10	418	275,880	25,330	301,210	**122,514**	**12,343**	2,395,000	78,000	44,514	41,735	76,951	253,543	1.37
14	2.5%	10	428	282,480	25,330	307,810	**125,110**	**12,343**	2,313,000	82,000	43,110	41,735	77,720	256,909	1.38
15	2.5%	11	439	289,740	27,863	317,603	**132,634**	**12,343**	2,222,000	91,000	41,634	41,735	78,498	265,210	1.37
16	2.5%	11	450	297,000	27,863	324,863	**134,996**		2,127,000	95,000	39,996	41,735	79,283	256,014	1.39
17	2.5%	11	461	304,260	27,863	332,123	**143,286**		2,022,000	105,000	38,286	41,735	80,075	265,096	1.36
18	2.5%	12	473	312,180	30,396	342,576	**150,396**		1,908,000	114,000	36,396	41,735	80,876	273,007	1.36
19	2.5%	11	484	319,440	27,863	347,303	**153,344**		1,789,000	119,000	34,344	41,735	81,685	276,764	1.36
20	2.5%	12	496	327,360	30,396	357,756	**161,202**		1,660,000	129,000	32,202	41,735	81,685	284,622	1.36
21	2.5%	12	508	335,280	30,396	365,676	**162,880**		1,527,000	133,000	29,880	41,735	82,502	287,117	1.38
22	2.5%	13	521	343,860	32,929	376,789	**175,486**		1,379,000	148,000	27,486	41,735	82,502	299,723	1.35
23	2.5%	12	533	351,780	30,396	382,176	**176,822**		1,227,000	152,000	24,822	41,735	83,327	301,884	1.37
24	2.5%	13	546	360,360	32,929	393,289	**183,086**		1,066,000	161,000	22,086	41,735	83,327	308,148	1.38
25	2.5%	14	560	369,600	35,462	405,062	**189,188**		896,000	170,000	19,188	41,735	84,160	315,083	1.39
26	2.5%	13	573	378,180	32,929	411,109	**189,128**		723,000	173,000	16,128	41,735	84,160	315,023	1.42
27	2.5%	14	587	387,420	35,462	422,882	**189,014**		547,000	176,000	13,014	41,735	85,002	315,751	1.46
28	2.5%	15	602	397,320	37,995	435,315	**188,846**		368,000	179,000	9,846	41,735	85,002	315,583	1.52
29	2.5%	14	616	406,560	35,462	442,022	**188,624**		186,000	182,000	6,624	41,735	85,002	315,361	1.55
30	2.5%	14	630	415,800	35,462	451,262	**189,348**		-	186,000	3,348	41,735	85,002	316,085	1.58
									Total Paid in Debt Service =	2,842,000	1,113,444				

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Corinne City
COUNTY: Box Elder
PROJECT DESCRIPTION: New tank and transmission line

FUNDING SOURCE: Federal SRF

78.2 % Loan & 21.8 % P.F.

ESTIMATED POPULATION:	695	NO. OF CONNECTIONS:	303	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$28.74 *			PROJECT TOTAL:	$3,953,170
CURRENT % OF AGI:	0.93%	FINANCIAL PTS:	57	LOAN AMOUNT:	$2,842,000
ESTIMATED MEDIAN AGI:	$36,886			PRINC. FORGIVENESS:	$790,750
STATE AGI:	$36,960			TOTAL REQUEST:	$3,632,750
SYSTEM % OF STATE AGI:	100%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 5.56%		AFTER REPAYMENT PENALTY & POINTS 1.80%
ASSUMED LENGTH OF DEBT, YRS:	30	30		30
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	5.56%		1.80%
REQUIRED DEBT SERVICE:	$94,733.33	$196,842.53		$123,432.13
*PARTIAL COVERAGE (15%):	$14,210.00	$29,526.38		$18,514.82
*ADD. COVERAGE AND RESERVE (10%):	$9,473.33	$19,684.25		$12,343.21
ANNUAL DEBT PER CONNECTION:	$390.81	$812.06		$509.21
O & M + FUNDED DEPRECIATION:	$68,290.00	$68,290.00		$68,290.00
OTHER DEBT + COVERAGE:	$52,168.75	$52,168.75		$52,168.75
REPLACEMENT RESERVE ACCOUNT:	$0.00	$0.00		$0.00
NEEDED SYSTEM INCOME:	$100,194.75	$100,194.75		$100,194.75
ANNUAL O&M PER CONNECTION:	$330.68	$330.68		$330.68
AVG MONTHLY WATER BILL:	$66.37	$101.48		$76.24
% OF ADJUSTED GROSS INCOME:	2.16%	3.30%		2.48%

* Current water bill is based on 2008 Revenue & number of connections

Corinne City

PROPOSED BOND REPAYMENT SCHEDULE

78.2 % Loan & 21.8 % P.F.

PRINCIPAL	$2,842,000.00	ANTICIPATED CLOSING DATE	26-Mar-09
INTEREST	1.80%	P&I PAYMT DUE	01-Jan-11
TERM	30	REVENUE BOND	
NOMIN. PAYMENT	$123,432.13	PRINC PREPAID:	$0.00

YEAR	BEGINNING BALANCE	DATE OF PAYMENT	PAYMENT		PRINCIPAL	INTEREST	ENDING BALANCE	PAYM NO.
2010	$2,842,000.00		$39,077.50	*	$0.00	$39,077.50	$2,842,000.00	0
2011	$2,842,000.00		$123,156.00		$72,000.00	$51,156.00	$2,770,000.00	1
2012	$2,770,000.00		$123,860.00		$74,000.00	$49,860.00	$2,696,000.00	2
2013	$2,696,000.00		$123,528.00		$75,000.00	$48,528.00	$2,621,000.00	3
2014	$2,621,000.00		$123,178.00		$76,000.00	$47,178.00	$2,545,000.00	4
2015	$2,545,000.00		$123,810.00		$78,000.00	$45,810.00	$2,467,000.00	5
2016	$2,467,000.00		$123,406.00		$79,000.00	$44,406.00	$2,388,000.00	6
2017	$2,388,000.00		$122,984.00		$80,000.00	$42,984.00	$2,308,000.00	7
2018	$2,308,000.00		$123,544.00		$82,000.00	$41,544.00	$2,226,000.00	8
2019	$2,226,000.00		$123,068.00		$83,000.00	$40,068.00	$2,143,000.00	9
2020	$2,143,000.00		$123,574.00		$85,000.00	$38,574.00	$2,058,000.00	10
2021	$2,058,000.00		$123,044.00		$86,000.00	$37,044.00	$1,972,000.00	11
2022	$1,972,000.00		$123,496.00		$88,000.00	$35,496.00	$1,884,000.00	12
2023	$1,884,000.00		$123,912.00		$90,000.00	$33,912.00	$1,794,000.00	13
2024	$1,794,000.00		$123,292.00		$91,000.00	$32,292.00	$1,703,000.00	14
2025	$1,703,000.00		$123,654.00		$93,000.00	$30,654.00	$1,610,000.00	15
2026	$1,610,000.00		$122,980.00		$94,000.00	$28,980.00	$1,516,000.00	16
2027	$1,516,000.00		$123,288.00		$96,000.00	$27,288.00	$1,420,000.00	17
2028	$1,420,000.00		$123,560.00		$98,000.00	$25,560.00	$1,322,000.00	18
2029	$1,322,000.00		$123,796.00		$100,000.00	$23,796.00	$1,222,000.00	19
2030	$1,222,000.00		$122,996.00		$101,000.00	$21,996.00	$1,121,000.00	20
2031	$1,121,000.00		$123,178.00		$103,000.00	$20,178.00	$1,018,000.00	21
2032	$1,018,000.00		$123,324.00		$105,000.00	$18,324.00	$913,000.00	22
2033	$913,000.00		$123,434.00		$107,000.00	$16,434.00	$806,000.00	23
2034	$806,000.00		$123,508.00		$109,000.00	$14,508.00	$697,000.00	24
2035	$697,000.00		$123,546.00		$111,000.00	$12,546.00	$586,000.00	25
2036	$586,000.00		$123,548.00		$113,000.00	$10,548.00	$473,000.00	26
2037	$473,000.00		$123,514.00		$115,000.00	$8,514.00	$358,000.00	27
2038	$358,000.00		$123,444.00		$117,000.00	$6,444.00	$241,000.00	28
2039	$241,000.00		$123,338.00		$119,000.00	$4,338.00	$122,000.00	29
2040	$122,000.00		$124,196.00		$122,000.00	$2,196.00	$0.00	30
			$3,742,233.50		$2,842,000.00	$900,233.50		

*Interest Only Payment

Corinne City

DWB Loan Terms		
Local Share (total):	$	20,420
Other Agency Funding:	$	300,000
DWB Grant Amount:	$	790,750
DWB Loan Amount:	$	2,842,000
DWB Loan Term:		30
DWB Loan Interest:		1.80%
DWB Loan Payment:	$	123,432

DW Expenses (Estimated)		
Proposed Facility Capital Cost:	$	3,981,590
Existing Facility O&M Expense:	$	68,290
Proposed Facility O&M Expense:	$	68,290
O&M Inflation Factor:		1.0%
Existing Debt Service:	$	41,735

DW Revenue Sources (Projected)		
Beginning Cash:	$	-
Existing Customers (ERC):		303
Projected Growth Rate:		2.5%
Impact Fee/Connection Fee:	$	2,533
Current Monthly User Charge:	$	22.49
Needed Average Monthly User Charge:	$	69.99

DW Revenue Projections

Yr	Growth Rate (%)	Annual Growth (ERC)	Total Users (ERC)	User Charge Revenue	Impact Fee Revenue	Total Revenue	DWB Loan Repayment	DWB Loan Reserves	Remaining Principal	Principal Payment	Interest Payment	Existing DW Debt Service	O&M Expenses	Total Expenses	Debt Service Ratio
0	2.5%	8	303	81,761	20,264	102,025	-	-	2,842,000	-	-	41,735	68,290	110,025	-
1	2.5%	8	311	261,204	20,264	281,468	**123,156**	**12,343**	2,770,000	72,000	51,156	41,735	68,290	245,524	1.29
2	2.5%	7	318	267,083	17,731	284,814	**123,860**	**12,343**	2,696,000	74,000	49,860	41,735	68,973	246,911	1.30
3	2.5%	8	326	273,802	20,264	294,066	**123,528**	**12,343**	2,621,000	75,000	48,528	41,735	69,663	247,269	1.36
4	2.5%	8	334	280,521	20,264	300,785	**123,178**	**12,343**	2,545,000	76,000	47,178	41,735	70,359	247,615	1.40
5	2.5%	9	343	288,080	22,797	310,877	**123,810**	**12,343**	2,467,000	78,000	45,810	41,735	71,063	248,951	1.45
6	2.5%	8	351	294,799	20,264	315,063	**123,406**	**12,343**	2,388,000	79,000	44,406	41,735	71,773	249,258	1.47
7	2.5%	9	360	302,358	22,797	325,155	**122,984**	**12,343**	2,308,000	80,000	42,984	41,735	72,491	249,553	1.53
8	2.5%	9	369	309,917	22,797	332,714	**123,544**	**12,343**	2,226,000	82,000	41,544	41,735	73,216	250,838	1.57
9	2.5%	9	378	317,476	22,797	340,273	**123,068**	**12,343**	2,143,000	83,000	40,068	41,735	73,948	251,094	1.62
10	2.5%	10	388	325,875	25,330	351,205	**123,574**	**12,343**	2,058,000	85,000	38,574	41,735	74,688	252,340	1.67
11	2.5%	10	398	334,274	25,330	359,604	**123,044**		1,972,000	86,000	37,044	41,735	75,435	240,214	1.72
12	2.5%	10	408	342,673	25,330	368,003	**123,496**		1,884,000	88,000	35,496	41,735	76,189	241,420	1.77
13	2.5%	10	418	351,072	25,330	376,402	**123,912**		1,794,000	90,000	33,912	41,735	76,951	242,598	1.81
14	2.5%	10	428	359,470	25,330	384,800	**123,292**		1,703,000	91,000	32,292	41,735	77,720	242,747	1.86
15	2.5%	11	439	368,709	27,863	396,572	**123,654**		1,610,000	93,000	30,654	41,735	78,498	243,887	1.92
16	2.5%	11	450	377,948	27,863	405,811	**122,980**		1,516,000	94,000	28,980	41,735	79,283	243,998	1.98
17	2.5%	11	461	387,187	27,863	415,050	**123,288**		1,420,000	96,000	27,288	41,735	80,075	245,098	2.03
18	2.5%	12	473	397,265	30,396	427,661	**123,560**		1,322,000	98,000	25,560	41,735	80,876	246,171	2.10
19	2.5%	11	484	406,504	27,863	434,367	**123,796**		1,222,000	100,000	23,796	41,735	81,685	247,216	2.13
20	2.5%	11	484	406,504	27,863	434,367	**123,796**		1,121,000	101,000	23,796	41,735	81,685	247,216	2.13
21	2.5%	13	497	417,422	32,929	450,351	**122,996**		1,018,000	103,000	21,996	41,735	82,502	247,233	2.23
22	2.5%	13	497	417,422	32,929	450,351	**123,178**		913,000	105,000	20,178	41,735	82,502	247,415	2.23
23	2.5%	12	509	427,501	30,396	457,897	**123,324**		806,000	107,000	18,324	41,735	83,327	248,386	2.27
24	2.5%	12	509	427,501	30,396	457,897	**123,434**		697,000	109,000	16,434	41,735	83,327	248,496	2.27
25	2.5%	13	522	438,420	32,929	471,349	**123,508**		586,000	111,000	14,508	41,735	84,160	249,403	2.34
26	2.5%	13	522	438,420	32,929	471,349	**123,546**		473,000	113,000	12,546	41,735	84,160	249,441	2.34
27	2.5%	13	535	449,338	32,929	482,267	**123,548**		358,000	115,000	10,548	41,735	85,002	250,285	2.40
28	2.5%	13	535	449,338	32,929	482,267	**123,514**		241,000	117,000	8,514	41,735	85,002	250,251	2.40
29	2.5%	13	548	460,257	32,929	493,186	**123,444**		122,000	119,000	6,444	41,735	85,852	251,031	2.47
30	2.5%	13	548	460,257	32,929	493,186	**123,338**	-	-	122,000	4,338	41,735	85,852	250,925	2.47
									Total Paid in Debt Service =	2,842,000	882,756				

02005 Corinne
Compliance Report
November 5, 2008

Administration:
No issues

Operator Certification:
No issues

Bacteriological Information:

Chemical Monitoring:

Lead/Copper:
Need 2007-2010 data

Consumer Confidence Report

Physical Facilities:
System lacks 10% of required source capacity and 10% of required storage capacity

Drinking Water Source Protection:

Plan Review:
No issues

6. 4) CONSIDERATION ON NAME CHANGE – Ken Wilde

DRINKING WATER BOARD
BOARD PACKET FOR
CONSIDERATION OF NAME CHANGE

STAFF COMMENTS & RECOMMENDATIONS:

The current committee name is "SRF / Conservation Committee". Drinking Water Board members have expressed a desire to change the committee name. People frequently refer to it as the SRF Committee. Staff has come up with the following possibilities for the new name :

Funding Committee
Financial Committee
SRF Committee
Financial Assistance Committee

SRF/CONSERVATION COMMITTEE COMMENTS AND RECOMMENDATION:

The SRF Conservation Committee recommends that the Drinking Water Board authorize a name change to Financial Assistance Committee.

AGENDA ITEM 7

2009 DRINKING WATER BOARD MEETING SCHEDULE

DRINKING WATER BOARD

2009 MEETING
SCHEDULE
SUBJECT TO CHANGE

MEETING DATE	PLACE	TOUR/WORK MEETING	NOTES
January 14, 2009	Salt Lake City		168 North 1950 West Room 101 all day Salt Lake City, Utah
March 5, 2009	St. George		In conjunction with the Rural Water Association of Utah's 2009 Annual Conference
May 13, 2009		LOCATION YET TO BE DETERMINED.	
July 8, 2009	**Logan?**	LOCATION YET TO BE DETERMINED.	
September 9, 2009	**Uintah Basin?**	LOCATION YET TO BE DETERMINED.	
November 18, 2009	Salt Lake City		168 North 1950 West Room 101 all day Salt Lake City, Utah

DRINKING WATER BOARD
FINANCIAL ASSISTANCE SUBMITTAL SCHEDULE

2009

APPLICATION CUT-OFF DATE		SRF PACKET MAILING DATE		SRF CONF CALL DATE		DWB PACKET DEADLINE DATE		**DWB MEETING DATE**
November 10, 2008		December 8, 2008		December 10, 2008 Wed. 9:00 AM		December 29, 2008 Monday BY NOON		**January 14, 2009**
December 29, 2008	4 weeks (approximately)	January 26, 2009	1 week (approximately)	February 11, 2009 Wed. 9:00 AM	1 week (approximately)	February 16, 2009 Monday BY NOON	2 weeks (approximately)	**March 5, 2009**
March 16, 2009		April 13, 2009		April 22, 2009 Wed. 9:00 AM		April 27, 2009 Monday BY NOON		**May 13, 2009**
May 11, 2009		June 8, 2009		June 17, 2009 Wed. 9:00 AM		June 22, 2009 Monday BY NOON		**July 8, 2009**
July 13, 2009		August 10, 2009		August 19, 2009 Wed. 9:00 AM		August 31, 2009 Monday BY NOON		**September 9, 2009**
September 21, 2009		October 19, 2009		October 28, 2009 Wed. 9:00 AM		November 9, 2009 Monday BY NOON		**November 18, 2009**
November 16, 2009		December 7, 2009		December 30, 2009 Wed. 9:00 AM		January 4, 2010 Monday BY NOON		**January 13, 2010**

AGENDA ITEM 8

RULES R309-700 and 705: SET RULE EFFECTIVE DATE - Ken Wilde

Proposed Rule Changes to
R309-700 through R309-705

DRINKING WATER BOARD
BOARD PACKET FOR
PROPOSED RULE CHANGES

STAFF COMMENTS & RECOMMENDATIONS:

On July l11, 2008, The Drinking Water Board authorized staff to proceed with rule making for Rules R309-700 and R309-705 and to submit the two rules to the Division of Administrative Rules.

On October 13, 2008, both rules were submitted to the Division of Administrative Rules. Comments were accepted until December 1, 2008, but none were received. The rules may become effective anytime on or after December 8, 2008.

STAFF RECOMMENDATION:

The Drinking Water Board authorizes staff to set an effective date for Rules R309-700 and R309-705.

Mike mentioned staff is recommending the Board revise the proposed rules as they would feel necessary and authorize staff to proceed with rulemaking or instruct staff to obtain any additional information or comments for consideration at a future Board meeting.

Mike discussion followed.

Ron Thompson moved the Board authorize staff to revise the proposed rules as they feel necessary, and authorize staff to proceed with rulemaking, or instruct staff to obtain any additional information or comments for consideration at a future Board meeting.

Craig Wellmaster, guest, addressed the Board.

Paul Hansen seconded.

CARRIED
(Unanimous)

ITEM 8 – STATE REVOLVING FUND (SRF) RULE REVISIONS R309-700 AND R309-705

Rich Peterson reported on the Proposed Revisions to Rule R309-700 and R309-9705. These two rules were brought to the Board last year for review. Rich reviewed what was changed and/or added in the two rules that are in the Board packet.

Discussion followed.

Rich Peterson mentioned staff is recommending review of the proposed changes to Rule R309-700 and R309-705, and if the Board reflects what is wanted, authorize staff to initiate the rulemaking process for the rule.

Ron Thompson moved the Board authorize the publication of the proposed rule changes to R309-700 and R309-705.

Myron Bateman seconded.

CARRIED
(Unanimous)

ITEM 9 – ST. GEORGE CITY ARSENIC EXEMPTION EXTENSION

Rich Peterson mentioned St. George is requesting the Drinking Water Board approve an Arsenic exemption extension to comply with the new Arsenic Standard for drinking water. St. George City's current extension expires in January 2009.

Rich mentioned St. George City is over the limit of 30,000 residents living in their community, thus making St. George City ineligible for an exemption.

Discussion followed.

AGENDA ITEM 9

PROPOSED RULE AMENDMENTS TO: R309-800 – Michael Grange

Proposed Revision to Rule
R309-352
Capacity Development Program

Staff has reviewed Rule R309-352 and has marked up the text with recommended revisions. The full text of the rule with recommended revisions is attached. Strikethrough in brackets **[-]** means delete and **<u>underline</u>** means add. The Board gave staff some suggested revisions and instructed staff to make a comprehensive review of the rule and return to the Board with draft revisions.

The suggested revisions were to renumber the rule to R309-800 to conform to recent changes in rule numbers used by The Division of Drinking Water, clarify some rule language, correct references to other Division rules to correspond to the rule numbers currently in use, and modify when a Capacity Assessment Review may be required in conjunction with an application for financial assistance.

STAFF RECOMMENDATION

Staff recommends the board review the proposed revisions to Rule R309-352, making it Rule R309-800, and if the revisions reflect the Boards intent, authorize staff to initiate the rule-making process for this rule.

R309-[~~352~~]800. Capacity Development Program

[~~Note: The Division of Drinking Water is currently revising rules. Because of this, some of the references to rule numbers outside of this document may be invalid. This rule will eventually be rewritten as R309-800.~~]

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Rule R309-[~~352~~]800. Capacity Development Program.

R309-[~~352~~]800-1. Authority.

(1) Under authority granted in Subsection 19-4-104(1)(a)(v), the Drinking Water Board adopts this rule implementing the capacity development program and governing the allotment of federal funds to public water systems to assist them to comply with the Federal 1996 Reauthorized Safe Drinking Water Act (SDWA).

R309-[~~352~~]800-2. Purpose.

(1) The SDWA makes certain federal funds available to states, through the State Revolving Fund Loan Program as defined in section 1452(k)(2)(C), to provide assistance to any public water system as part of a capacity development strategy developed and implemented in accordance with section 1420(c) to ensure all new public water systems will be able to comply with the SDWA, to enhance existing public water systems' capability to comply with the SDWA, and determine which public water systems applying for financial assistance are eligible to use these State Revolving Funds.

(2) The purpose of the Capacity Development Program is to enhance and ensure the technical, [~~financial~~]managerial, and [~~managerial~~]financial capacity of water systems. The long range goals are:

1 - to promote long term compliance with drinking water regulations [~~for the long term~~] : and,

2 - to promote the public health protection objectives of the [~~Safe Drinking Water Act~~]SDWA.

R309-[~~352~~]800-3. Definitions.

(1) Definitions for terms used in this rule are given in R309-[~~200~~]110, except as modified below.

(2) "Capacity Development" means the technical, managerial, and financial capabilities of the water system to plan for, achieve, and maintain compliance with applicable drinking water standards.

(3) "Drinking Water Region Planning" means a county wide water plan, administered locally by a coordinator, who facilitates the input of representatives of each public water system in the county with a selected consultant, to determine how each public water system will either collectively or individually comply with source protection, operator certification, monitoring including consumer confidence reports, capacity development including technical, financial and managerial aspects, environmental issues, available funding and related studies.

(4) "Small Water System" means a water system with less than 3,300 people being served.

(5) "Public Water System" means a system providing water for human consumption and other domestic uses through pipes or other constructed conveyances, which has at least 15 service connections or serves an average of at least 25 individuals daily at least 60 days out of the year.

(6) "Non-Community Water System" (NCWS) means a public water system that is not a community water system. There are two types of NCWS's: transient and non-transient.

(7) "Non-Transient Non-Community Water System" (NTNCWS) means a public water system that regularly serves at least 25 of the same nonresident persons per day for more than six months per year. Examples of such systems are those serving the same individuals (industrial workers, school children, church members) by means of a separate system.

(8) "New Water System" means a system that will become a community water system or non-transient, non-community water system on or after October 1, 1999.

(9) "Required reserve" means funds set aside to meet requirements set forth in a loan covenant/bond indenture.

R309-[~~352~~]800-4. General.

(1) Capacity development criteria are to be used as a guideline for all water systems. These criteria constitute a standard applied when reviewing new systems applications, reviewing applications for financial assistance and assessing capacity of water systems rated unapproved or in significant non-compliance by the State or the EPA.

(2) Water systems shall meet the following criteria:

(a) Technical Capacity Criteria:

(i) Finished water shall meet all drinking water standards as required by Utah State Rules;

(ii) Personnel shall operate the system in accordance with the operations and maintenance manual;

(iii) A valid water right shall be obtained;

(iv) Water system shall meet source, storage, and distribution requirements as per Utah State Rules;

(v) Water system shall not be rated unapproved or in significant noncompliance by the State or the EPA.

(b) Managerial Capacity Criteria:

(i) The system owner(s) shall be clearly identified to the Executive Secretary;

(ii) The system shall meet all of the operator certification requirements as per R309-[~~301~~]300 and backflow technician certification requirements as per R309-[~~302~~]305.

(iii) A system or method shall be in-place to effectively maintain all requisite records, distribution system histories/maps, and compliance information; and

(iv) An operating plan shall include names and certification level of the system operator(s), facility operation and maintenance manuals, routine maintenance procedures, water quality violations response procedures, water quality monitoring plan, training plan, and emergency response plan;

(v) The Executive Secretary of the Drinking Water Board shall be informed of management changes.

(c) Financial Capacity Criteria:

(i) Revenues shall be greater than expenses;

(ii) A financial statement compilation by a Certified Public Accountant, or an audit if otherwise required of the water system, shall be completed every three years;

(iii) The water system shall devise and implement a managerial budget and accounting process in accordance with generally accepted principals;

(iv) The operating ratio (operating revenue divided by operating expenses excluding depreciation and required reserves) shall be greater than 1.0;

(v) The coverage ratio (total revenues minus operating expenses excluding depreciation and required reserves divided by annual debt service) shall be greater than 1.0;

(vi) Customers shall be metered; and

(vii) An emergency/replacement reserve shall be created and funded

R309-[~~352~~]800-5. Requirements for New Community and New Non-transient, Non-community Water Systems.

(1) Feasibility Review, (See R309-[~~101-3~~]100-6).

(2) Each proposed, new water system must demonstrate that it has adequate technical, managerial, and financial capacity before it may provide water for human consumption. Proposed water systems shall submit the following for Capacity Assessment Review:

(3) Project Notification form [~~(see R309-201-6)~~], available on the Internet at www.drinkingwater.utah.gov/blank_forms.htm,

(4) A business plan, which includes a facilities plan, management plan, and financial plan.

(a) Facilities plan. The facilities plan shall describe the scope of the water services to be provided and shall include the following:

(i) A description of the nature and extent of the area to be served, and provisions for extending the water supply system to include additional area. The description shall include population and land use projections and forecasts of water usage;

(ii) An assessment of current and expected drinking water compliance based on monitoring data from the proposed water source;

(iii) A description of the alternatives considered, including interconnections with other existing water systems, and the reasons for selecting the method of providing water service. This description shall include the technical, managerial, financial and operational reasons for the selected method, and

(iv) An engineering description of the facilities to be constructed, including the construction phases and future phases and future plans for expansion. This description shall include an estimate of the full cost of any required construction, operation, and maintenance;

(b) Management plan. The management plan shall describe what is needed to provide for effective management and operation of the system and shall include the following:

(i) Documentation that the applicant has the legal right and authority to take the measures necessary for the construction, operation, and maintenance of the system. The documentation shall include evidence of ownership if the applicant is the owner of the system or, if the applicant is not the owner, legally enforceable management contracts or agreements;

(ii) An operating plan that describes the tasks to be performed in managing and operating the system. The operating plan shall consist of administrative and management organization charts, plans for staffing the system with certified operators, and provisions for an operations and maintenance manual; and

(iii) Documentation of credentials of management and operations personnel, cooperative agreements or service contracts including demonstration of compliance with R309-[~~301~~]300 water system operator certification rule; and

(c) Financial plan. The financial plan shall describe the system's expected revenues, cash flow, income and issuance and repayment of debt for meeting the costs of construction, and the costs of operation and maintenance for at least five years from the date the applicant expects to begin system operation.

(5) After the information submitted by the applicant is complete, the Division of Drinking Water shall conduct a Capacity Assessment Review. The applicant shall be notified in writing whether or not the new system has demonstrated adequate capacity. No new community or non-transient, non-community system will be approved if it lacks adequate capacity.

(6) Those systems constructed without approval shall be subject to: points as per R309-[~~150~~]400, administrative and/or civil penalties and fines.

R309-[~~352~~]800-6. Minimum Capacity Required for Financial Assistance Under Provisions of R309- 351.

(1) Financial assistance under the provisions of R309-705 *Financial Assistance: Federal Drinking Water State Revolving Fund (SRF) Loan Program* shall not be available to a water system that lacks the technical, managerial, or financial capability to maintain SDWA compliance, or is in significant non-compliance with any provisions of R309-400 through 405 or 500 through 550, unless the use of the financial assistance will ensure compliance or if the owner of the system agrees to undertake feasible and appropriate changes in operation to ensure technical, managerial, and financial capacity to maintain long term compliance with SDWA. [~~To obtain financial assistance, the applicant shall follow a two-step application process. First, the applicant shall complete a short application to establish a position on the priority list. A second application shall include~~

~~Capacity Assessment Worksheets, project information, and financial information to verify priority ranking, determine eligibility, and provide a basis for grant/loan parameters.~~]

(2) Financial assistance under the provisions of R309-[~~351~~]700 *Financial Assistance: State Drinking Water State Revolving Fund (SRF) Loan Program* [~~shall not be available to a system that lacks the technical, managerial, or financial capability to maintain SDWA compliance, or is in significant noncompliance with any R309-101 through 104 or 200 through 211, unless the use of the financial assistance will ensure compliance or if the owner of the system agrees to undertake feasible and appropriate changes in operation to ensure technical, managerial, and financial capacity to comply with the SDWA over the long term.~~] is not contingent upon completing a Capacity Development Assessment. However, Drinking Water Staff may, at their discretion and base on available water system information, determine that such an assessment is necessary before considering a given project for financial assistance under the State's Revolving Loan Program. If a Capacity Development Assessment is deemed necessary, Staff will require that the applicant complete and submit the Capacity Development worksheets and financial information.

(3) Applicants for financial assistance shall complete an application from, available on the Internet at www.drinkingwater.utah.gov/blank_forms.htm. The application shall include project information and water system financial information and will be used to establish project priority ranking, determine eligibility, and provide a basis for determining funding package parameters. If necessary, as outlined in (1) and (2) above, Drinking Water Staff will require that the water system also complete and submit the Capacity Development worksheets and financial information for review.

Key: drinking water, funding, regionalization, capacity development

[~~September 15, 1999~~]

AGENDA ITEM 10

PROPOSED SUBSTANTIVE RULE AMENDMENTS RULES R309-500, 510-5, 520-11, 525-11(b)(c)(v), 530-6(5)(c), and 545-15(1) and (2) – Bill Birkes and Bob Hart

PROPOSED SUBSTANTIVE CHANGES
FOR
RULE R309-500

Recently staff reviewed current engineering and construction rules and make the following recommendations suggested by staff, contractors or others.

Staff is concerned that when public water systems who identify a professional engineer responsible for the entire system and request plan review waiver in accordance with R309-500-6(3)(b) they may not have satisfactory drinking water installation standards or standards that are not compliant with today's rules. More and more systems are taking advantage of this part of the rules and staff is concerned that if plan review waivers are granted water lines may be installed improperly.

For this reason, staff proposes the following amendment to R309-500-6(3)(b) which will add the condition of previous review and approval of drinking water pipeline installation standards as an additional requirement, along with the identification of a professional engineer directly responsible for the entire drinking water system, before being eligible for plan review waivers.

Staff Recommendation: Staff, believing that the above mentioned changes are substantive, asks the Board to review the proposed changes and, if they agree, authorize staff to start the rulemaking process and file the proposed rule amendments for publication in the Utah Bulletin of February 1, 2009.

R309. Environmental Quality, Drinking Water.
R309-500. Facility Design and Operation: Plan Review, Operation and Maintenance Requirements.
R309-500-1. Purpose.

The purpose of this rule is to describe plan review procedures and requirements, clarify projects requiring review, and inspection requirements for drinking water projects. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-500-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-500-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-500-4. General.

(1) Construction and Operation of New Facilities.

As authorized in 19-4-106(3) of the Utah Code, the Executive Secretary may review plans, specifications, and other data pertinent to proposed or expanded water supply systems to insure proper design and construction.

Plans and specifications and a business plan as required by R309-800-5, along with a completed project notification form, shall be submitted to the Executive Secretary for any new water systems or previously un-reviewed water systems unless acceptable data can be presented that the proposed or existing water system will not become a "public water system" as defined in 19-4-102 of the Utah Code or in R309-110.

Construction of new facilities for public water systems or existing facilities of previously un-reviewed public drinking water systems shall conform to rules R309-500 through R309-550; the "Facility Design and Operation" rules. There may be times in which the requirements of the Facility Design and Operation rules are not appropriate. Thus, the Executive Secretary may grant an "exception" to the Facility Design and Operation rules if it can be shown that the granting of such an exception will not jeopardize the public health.

Construction of a public drinking water project shall not begin until complete plans and specifications have been approved in writing by the Executive Secretary unless waivers have been issued as allowed by R309-500-6(3). This approval shall be

referred to as the Plan Approval.

Furthermore, no new public drinking water facility shall be put into operation until written approval to do so has been given by the Executive Secretary or this requirement waived. This approval is referred to as the Operating Permit.

(2) Existing Facilities.

All existing public drinking water systems shall be capable of reliably delivering water which meets the minimum current standard of drinking water quantity and quality requirements. The Executive Secretary may require modification of existing systems in accordance with R309-500 through R309-550 when such modifications are needed to reliably achieve minimum quantity and quality requirements.

(3) Operation and Maintenance of Existing Facilities.

Public drinking water system facilities shall be operated and maintained in a manner which protects the public health. As a minimum, the operation and maintenance procedures of R309-500 through R309-550 shall be adhered to.

R309-500-5. Public Drinking Water Project.

(1) Definition.

A public drinking water project, requiring the submittal of a project notification form along with plans and specifications, is any of the following:

(a) The construction of any facility for a proposed drinking water system (see 19-4-106(3) of the Utah Code or R309-500-4(1) above describing the authority of the Executive Secretary).

(b) Any addition to, or modification of, the facilities of an existing public drinking water system which may affect the quality or quantity of water delivered.

(c) Any activity, other than on-going operation and maintenance procedures, which may affect the quality or quantity of water delivered by an existing public drinking water system. Such activities include:

(i) the interior re-coating or re-lining of any raw or drinking water storage tank, or water storage chamber within any treatment facility,

(ii) the "in-situ" re-lining of any pipeline,

(iii) a change or addition of any primary coagulant water treatment chemical (excluding filter, flocculent or coagulant aids) when the proposed chemical does not appear on a list of chemicals pre-approved by the Executive Secretary for a specific treatment facility, and

(iv) the re-development of any spring or well source or replacement of a well pump with one of different capacity.

(2) On-going Operation and Maintenance Procedures.

On-going operation and maintenance procedures are not considered public drinking water projects and, accordingly, are not subject to the project notification, plan approval and operating permit requirements of this rule. However, these activities shall be carried out in accordance with all operation and maintenance requirements contained in R309-500 through R309-

550 and specifically the disinfection, flushing and bacteriological sampling and testing requirements of ANSI/AWWA C651-05 for pipelines, ANSI/AWWA C652-02 for storage facilities, and ANSI/AWWA C654-03 for wells before they are placed back into service. The following activities are considered to be on-going operation and maintenance procedures:

(a) pipeline leak repair,

(b) replacement of existing deteriorated pipeline where the new pipeline segment is the same size as the old pipeline,

(c) tapping existing water mains with corporation stops so as to make connection to new service laterals to individual structures,

(d) [~~(c)~~] distribution pipeline additions where the pipeline size is the same as the main supplying the addition, the length is less than 500 feet and contiguous segments of new pipe total less than 1000 feet in any fiscal year,

(e) [~~(d)~~] entry into a drinking water storage facility for the purposes of inspection, cleaning and maintenance, and

(f) [~~(e)~~] replacement of equipment or pipeline appurtenances with the same type, size and rated capacity (fire hydrants, valves, pressure regulators, meters, service laterals, chemical feeders and booster pumps including deep well pumps).

R309-500-6. Plan Approval Procedure.

(1) Project Notification.

The Division shall be notified prior to the construction of any "public drinking water project" as defined in R309-500-5(1) above. The notification may be prior to or simultaneous with submission of construction plans and specifications as required by R309-500-6(2) below. Notification shall be made by the management of the regulated public water system on a form provided by the Division. Information required by this form shall be determined by the Division and may include:

(a) whether the project is for a new or existing public drinking water system,

(b) the professional engineer, registered in the State of Utah, designing the project and his/her experience designing public drinking water projects within the state,

(c) the individual(s) who will be inspecting the project during construction and whether such inspection will be full-time or part time,

(d) whether required approvals or permits from other governmental agencies (e.g. local planning commissions, building inspectors, Utah Division of Water Rights)_are awaiting approval by the Executive Secretary, the agency's name and contact person,

(e) the fire marshal, fire district or other entity having legal authority to specify requirements for fire suppression in the project area,

(f) for community and non-transient non-community public water systems or any public water system treating surface water, the name of the certified operator who is, or will be, in direct responsible charge of the water system,

(g) whether the water system has a registered professional engineer employed, appointed or designated as being directly responsible for the entire system design and his or her name and whether the system is requesting waiving of plan submittal under conditions of R309-500-6 (3),

(h) the anticipated construction schedule, and

(i) a description of the type of legal entity responsible for the water system (i.e. corporation, political subdivision, mutual ownership, individual ownership, etc.) and the status of the entity with respect to the rules of the Utah Public Service Commission.

(2) Pre-Construction Requirements.

All of the following shall be accomplished before construction of any public drinking water project commences:

(a) Contract documents, plans and specifications for a public drinking water project shall be submitted to the Division at least 30 days prior to the date on which action is desired unless the system is eligible for and has requested waiving of plan submittal. Any submittal shall include engineering reports, pipe network hydraulic analyses, water consumption data, supporting information, evidence of rights-of-way and reference to any previously submitted master plans pertinent to the project, along with a description of a program for keeping existing water works facilities in operation during construction so as to minimize interruption of service.

(b) Plans and specifications shall be prepared for every anticipated public water system project. The design utilized shall conform to the requirements of R309-500 through R309-550. Furthermore, the plans and specification shall be sufficiently detailed to assure that the project shall be properly constructed. Drawings shall be compatible with Division's document storage and microfilming practice. Drawings which are illegible or of unusual size shall not be accepted for review. Drawing size shall not exceed 30" x 42" nor be less than 8-1/2" x 11".

(c) The plans and specifications shall be stamped and signed by a licensed professional engineer in accordance with Section 58-22-602(2) of the Utah Code.

(d) Plans and specifications shall be reviewed for conformance with R309-500 through R309-550. No work shall commence on a public water system project until a plan approval has been issued by the Executive Secretary unless conditions outlined in R309-500-6(3) are met and waiving of plan submittal has been requested. If construction or the ordering of substantial equipment has not commenced within one year, a renewal of the Plan Approval shall be obtained prior to proceeding with construction.

(e) If, in the judgment of the Executive Secretary, alternate designs or specific solutions can protect the public health to the same or greater extent as achieved in R309-500 through R309-550, the Executive Secretary may grant an exception thereto (see the third paragraph of R309-500-4(1)).

(f) Novel equipment or treatment techniques may be developed which are not specifically addressed by these rules. These may be

accepted by the Executive Secretary if it can be shown that:

(i) the technique will produce water meeting the requirements of R309-200 of these rules,

(ii) the Executive Secretary has determined that it will protect public health to the same extent provided by comparable treatment processes outlined in these rules, and

(iii) the Executive Secretary has determined the technique is as reliable as any comparable treatment process outlined is these rules.

(3) Waiving of Plan Submittal Requirement.

With identification of a professional engineer, as indicated below, on a project notification form the plan submittal requirement may be waived for certain projects. In these instances, in lieu of plans and specifications, a "certification of rule conformance" shall be submitted along with the additional information required for an operating permit (see R309-500-9), signed by the professional engineer identified to Executive Secretary in (b) or, if the system has not employed, appointed, or designated such, the registered professional engineer who prepared the items in (a). Projects eligible for this waiving of plan submittal are:

(a) distribution system improvements (excluding pressure reducing valve stations and in-line booster pump stations) which conform to a "master plan" previously reviewed and approved by the Executive Secretary and installed in accordance with the "system's standard drawings," also previously reviewed and approved by the Executive Secretary, or

(b) distribution system improvements consisting solely of pipelines and pipeline appurtenances (excluding pressure reducing valve stations and in-line booster pump stations);

(i) less than or equal to 4 inches in diameter in water systems (without fire hydrants) serving solely a residential population less than 3,300;

(ii) less than or equal to 8 inches in diameter in water systems (with fire hydrants) providing water for mixed use (commercial, industrial, agricultural and/or residential) to a population less than 3,300;

(iii) less than or equal to 12 inches in diameter in water systems(with fire hydrants) providing water for mixed use to a population between 3,300 and 50,000;

(iv) less than or equal to 16 inches in diameter in water systems (with fire hydrants) providing water for mixed use to a population greater than 50,000.

Additionally, the above systems in (b) shall employ, appoint or designate a registered professional engineer who is directly responsible for the entire public water system design and identify this individual to the Executive Secretary as well as have standard installation drawings previously reviewed and approved by the Division before being eligible for waiving of plan submittal requirements.

R309-500-7. Inspection During Construction.

Staff from the Division, or the appropriate local health department, after reasonable notice and presentation of credentials may make visits to the work site to assure compliance with these rules.

R309-500-8. Change Orders.

Any deviations from approved plans or specifications affecting capacity, hydraulic conditions, operating units, the functioning of water treatment processes, or the quality of water to be delivered, shall be reported to the Executive Secretary. If deemed appropriate, the Executive Secretary may require that revised plans and specifications be submitted for review. Revised plans or specifications shall be submitted to the Division in time to permit the review and approval of such plans or specifications before any construction work, which will be affected by such changes, is begun.

R309-500-9. Issuance of Operating Permit.

The Division shall be informed when a public drinking water project, or a well-defined phase thereof, is at or near completion. The new or modified facility shall not be used until an "Operating Permit" is issued, in writing, by the Executive Secretary. This permit shall not be issued until all of the following items are submitted and found to be acceptable for all projects with the exception of distribution lines (including in-line booster pump stations or pressure reducing stations), which may be placed into service prior to submittal of all items if the professional engineer responsible for the entire system, as identified to the Executive Secretary, has received items (1) and (4):

(1) a statement from a registered professional engineer that all conditions of Plan Approval were accomplished ("certification of rule conformance"),

(2) as-built "record" drawings; unless no changes are made from previously submitted and approved plans during construction,

(3) confirmation that a copy of the as-built "record" drawings has been received by the water system owner,

(4) evidence of proper flushing and disinfection in accordance with the appropriate ANSI/AWWA Standard,

(5) where appropriate, water quality data

(6) a statement from the Engineer indicating what changes to the project were necessary during construction, and certification that all of these changes were in conformance with these rules ("certification of rule conformance"),

(7) all other documentation which may have been required during the plan review process, and

(8) confirmation that the water system owner has been provided with an Operation and Maintenance manual for the new facility.

R309-500-10. Adequacy of Wastewater Disposal.

Plans and specifications for new water systems, or facilities

required as a result of proposed subdivision additions to existing water systems, shall only be approved if the method(s) of wastewater disposal in the affected area have been approved, or been determined to be feasible, by the Utah Division of Water Quality or the appropriate local health agency.

R309-500-11. Financial Viability.

Owners of new or existing water systems are encouraged to develop realistic financial strategies for recouping the costs of constructing and operating their systems. Plans for water system facilities shall not be approved when it is obvious that public health will eventually be threatened because the anticipated usage of the system will not generate sufficient funds to insure proper operation and maintenance of the system (see also R309-352-5).

R309-500-12. Fee Schedule.

The Division may charge a fee for the review of plan and specifications. A fee schedule is available from the Division.

R309-500-13. Other Permits.

Local, county or other state permits may also be necessary before beginning construction of any drinking water project.

R309-500-14. Reference Documents.

All references made in R309-500 through R309-550 are available for inspection at the Division's office.

R309-500-15. Violations of These Rules.

Violations of rule contained in R309-500 through R309-550 are subject to the provisions of the Utah Safe Drinking Water Act (Title 19, Chapter 4 Section 109 of the Utah Code) and may be subject to fines and penalties.

KEY: drinking water, plan review, operation and maintenance requirements, permits
Date of Enactment or Last Substantive Amendment: Febraury, 2009 [~~August 15, 2001~~]
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

PROPOSED SUBSTANTIVE CHANGES
FOR
RULE R309-510

Recently staff reviewed current engineering and construction rules and make the following recommendations suggested by staff, contractors or others.

Staff is concerned that public water systems seeking a reduction in the minimum quantities outlined in R309-510 are confused by the 90% confidence level cited in R309-510-5 as an acceptable measure prior to granting any reductions.

For this reason, staff proposes the following amendment to R309-510-5 which proposes to use the term 90^{th} percentile of acceptable data as the reduced minimum. This will allow the Executive Secretary to determine what amount and the nature of the data to be considered as acceptable (certain number of days of peak day demand to establish minimum source capacity; certain number of years of annual demand to establish minimum water right requirements; and certain number of readings of peak hourly demand to establish minimum peak instantaneous demand. Also, adding language allowing the Executive Secretary to reconsider any reduced minimums if the nature and use of the system changes.

Staff Recommendation: Staff, believing that the above mentioned changes are substantive, asks the Board to review the proposed changes and, if they agree, authorize staff to start the rulemaking process and file the proposed rule amendments for publication in the Utah Bulletin of February 1, 2009.

R309. Environmental Quality, Drinking Water.
R309-510. Facility Design and Operation: Minimum Sizing Requirements.
R309-510-1. Purpose.

This rule specifies requirements for the sizing of public drinking water facilities such as sources (along with their associated treatment facilities), storage tanks, and pipelines. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-510-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-510-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-510-4. General.

This rule provides estimates of quantities and flow rates which shall be used in the design of new systems, or if there is an absence of data collected by the public water system meeting the required confidence level for a reduction mentioned below, when evaluating water sources, storage facilities and pipelines. Within each of these three broad categories, the designer shall ascertain the contributions on demand from the indoor use of water, the outdoor use of water, and fire suppression activities (if required by local authorities). These components must be added together to determine the total demand on a given facility.

R309-510-5. Reduction of Requirements.

If acceptable data are presented, certain number of days of peak day demand to establish minimum source capacity; certain number of years of annual demand to establish minimum water right requirements; and certain number of readings of peak hourly demand to establish minimum peak instantaneous demand; [~~at or above the 90% confidence level,~~] showing that the requirements made herein are excessive for a given project, the requirements may be appropriately reduced to the 90th percentile of readings, on a case by case basis by the Executive Secretary. In the case of Recreational Home Developments, in order to qualify for a quantity reduction, not only must the actual water consumption be less than quantities required by rule ~~[(with the confidence level indicated above)]~~but enforceable policy restrictions must have been

approved which prevent the use of such dwellings as a permanent domicile and these restrictions shall have been consistently enforced. The Executive Secretary may re-consider any reduced minimums if the nature and use of the system changes.

R309-510-6. Water Conservation.

This rule is based upon typical current water consumption patterns in the State of Utah. They may be excessive in certain settings where legally enforceable water conservation measures exist. In these cases the requirements made in this section may be reduced on a case-by-case basis by the Executive Secretary.

R309-510-7. Source Sizing.

(1) Peak Day Demand and Average Yearly Demand.

Sources shall legally and physically meet water demands under two separate conditions. First, they shall meet the anticipated water demand on the day of highest water consumption. This is referred to as the peak day demand. Second, they shall also be able to provide one year's supply of water, the average yearly demand.

(2) Estimated Indoor Use.

In the absence of firm water use data, Tables 510-1 and 510-2 shall be used to estimate the peak day demand and average yearly demand for indoor water use.

TABLE 510-1
Source Demand for Indoor Use

Type of Connection	Peak Day Demand	Average Yearly Demand	
Year-round use			
Residential	800 gpd/conn	146,000 gal./conn	
ERC	800 gpd/ERC	146,000 gal./ERC	
Seasonal/Non-residential use			
Modern Recreation Camp	60 gpd/person		(see note 1)
Semi-Developed Camp			
a. with pit privies	5 gpd/person		(see note 1)
b. with flush toilets	20 gpd/person		(see note 1)
Hotel, Motel, and Resort	150 gpd/unit		(see note 1)
Labor Camp	50 gpd/person		(see note 1)
Recreational Vehicle Park	100 gpd/pad		(see note 1)
Roadway Rest Stop	7 gpd/vehicle		(see note 1)
Recreational Home Development	400 gpd/conn		(see note 1)

Note 1. Annual demand shall be based on the number of days the system will be open during the year times the peak day demand unless data acceptable to the Division, with a confidence level of 90% or greater showing a lesser annual consumption, can be presented.

TABLE 510-2

Source Demand for Individual Establishments[a]
(Indoor Use)

Type of Establishment	Peak Day Demand (gpd)
Airports	
a. per passenger	3
b. per employee	15
Boarding Houses	
a. for each resident boarder and employee	50
b. for each nonresident boarders	10
Bowling Alleys, per alley	
a. with snack bar	100
b. with no snack bar	85
Churches, per person	5
Country Clubs	
a. per resident member	100
b. per nonresident member present	25
c. per employee	15
Dentist's Office	
a. per chair	200
b. per staff member	35
Doctor's Office	
a. per patient	10
b. per staff member	35
Fairgrounds, per person	1
Fire Stations, per person	
a. with full-time employees and food prep.	70
b. with no full-time employees and no food prep.	5
Gyms	
a. per participant	25
b. per spectator	4
Hairdresser	
a. per chair	50
b. per operator	35
Hospitals, per bed space	250
Industrial Buildings, per 8 hour shift, per employee (exclusive of industrial waste)	
a. with showers	35
b. with no showers	15
Launderette, per washer	580
Movie Theaters	
a. auditorium, per seat	5
b. drive-in, per car space	10
Nursing Homes, per bed space	280
Office Buildings and Business Establishments, per shift, per employee (sanitary wastes only)	
a. with cafeteria	25
b. with no cafeteria	15
Picnic Parks, per person (toilet wastes only)	5
Restaurants	
a. ordinary restaurants (not 24 hour service)	35 per seat

b. 24 hour service	50 per seat
c. single service customer utensils only	2 per customer
d. or, per customer served (includes toilet and kitchen wastes)	10
Rooming House, per person	40
Schools, per person	
a. boarding	75
b. day, without cafeteria, gym or showers	15
c. day, with cafeteria, but no gym or showers	20
d. day, with cafeteria, gym and showers	25
Service Stations[(b)] ,per vehicle served	10
Skating Rink, Dance Halls, etc., per person	
a. no kitchen wastes	10
b. Additional for kitchen wastes	3
Ski Areas, per person (no kitchen wastes)	10
Stores	
a. per public toilet room	500
b. per employee	11
Swimming Pools and Bathhouses[(c)] ,per person	10
Taverns, Bars, Cocktail Lounges, per seat	20
Visitor Centers, per visitor	5

NOTES FOR TABLE 510-2:

1. Source capacity must at least equal the peak day demand of the system. Estimate this by assuming the facility is used to its maximum.

2. Generally, storage volume must at least equal one average day's demand.

3. Peak instantaneous demands may be estimated by fixture unit analysis as per Appendix E of the 200 International Plumbing Code.

(a) When more than one use will occur, the multiple use shall be considered in determining total demand. Small industrial plants maintaining a cafeteria and/or showers and club houses or motels maintaining swimming pools and/or laundries are typical examples of multiple uses. Uses other than those listed above shall be considered in relation to established demands from known or similar installations.

(b) or 250 gpd per pump,

(c) 20 x {Water Area (Ft^2) / 30} + Deck Area (Ft^2)

(3) Estimated Outdoor Use.

In the absence of firm water use data, Table 510-3 shall be used to estimate the peak day demand and average yearly demand for outdoor water use. The following procedure shall be used:

(a) Determine the location of the water system on the map entitled Irrigated Crop Consumptive Use Zones and Normal Annual Effective Precipitation, Utah as prepared by the Soil Conservation Service (available from the Division). Find the numbered zone, one through six, in which the water system is located (if located in an area described "non-arable" find nearest numbered zone).

(b) Determine the net number of acres which may be

irrigated. This is generally done by starting with the gross acreage, then subtract out any area of roadway, driveway, sidewalk or patio pavements along with housing foundation footprints that can be reasonably expected for lots within a new subdivision or which is representative of existing lots. Before any other land area which may be considered "non-irrigated" (e.g. steep slopes, wooded areas, etc.) is subtracted from the gross area, the Division shall be consulted and agree that the land in question will not be irrigated.

(c) Refer to Table 510-3 to determine peak day demand and average yearly demand for outdoor use.

(d) The results of the indoor use and outdoor use tables shall be added together and source(s) shall be legally and physically capable of meeting this combined demand.

TABLE 510-3
Source Demand for Irrigation
(Outdoor Use)

Map Zone	Peak Day Demand (gpm/irrigated acre)	Average Yearly Demand (AF/irrigated acre)
1	2.26	1.17
2	2.80	1.23
3	3.39	1.66
4	3.96	1.87
5	4.52	2.69
6	4.90	3.26

(4) Accounting for Variations in Source Yield.

The design engineer shall consider whether flow from the source(s) may vary. Where flow varies, as is the case for most springs, the minimum flowrate shall be used in determining the number of connections which may be supported by the source(s). Where historical records are sufficient, and where peak flows from the source(s) correspond with peak demand periods, the Executive Secretary may grant an exception to this requirement.

R309-510-8. Storage Sizing.

(1) General.

Each storage facility shall provide:

(a) equalization storage volume, to satisfy average [~~peak~~] day demands for water for indoor use as well as outdoor use,

(b) fire suppression storage volume, if the water system is equipped with fire hydrants and intended to provide fire suppression water, and

(c) emergency storage, if deemed appropriate by the water supplier or the Executive Secretary, to meet demands in the event of an unexpected emergency situation such as a line break or a treatment plant failures.

(2) Equalization Storage.

(a) All public drinking water systems shall be provided with equalization storage. The amount of equalization storage which

must be provided varies with the nature of the water system, the extent of outdoor use and the location of the system.

(b) Required equalization storage for indoor use is provided in Table 510-4. Storage requirements for non-community systems not listed in this table shall be determined by calculating the average day demands from the information given in Table 510-2.

TABLE 510-4
Storage Volume for Indoor Use

Type	Volume Required (gallons)
Community Systems	
Residential; per single resident service connection	400
Non-Residentail; per Equivalent Residential Connection (ERC)	400
Non-Community Systems	
Modern Recreation Camp; per person	30
Semi-Developed Camp; per person	
a. with Pit Privies	2.5
b. with Flush Toilets	10
Hotel, Motel and Resort; per unit	75
Labor Camp; per unit	25
Recreational Vehicle Park; per pad	50
Roadway Rest Stop; per vehicle	3.5
Recreational Home Development; per connection	400

(c) Where the drinking water system provides water for outdoor use, such as the irrigation of lawns and gardens, the equalization storage volumes estimated in Table 510-5 shall be added to the indoor volumes estimated in Table 510-4. The procedure for determining the map zone and irrigated acreage for using Table 510-5 is outlined in Section R309-510-7(3).

TABLE 510-5
Storage Volume for Outdoor Use

Map Zone	Volume Required (gallons/irrigated acre)
1	1,782
2	1,873
3	2,528
4	2,848
5	4,081
6	4,964

(3) Fire Suppression Storage.

Fire suppression storage shall be required if the water system is intended to provide fire fighting water as evidenced by fire hydrants connected to the piping. The design engineer shall

consult with the local fire suppression authority regarding needed fire flows in the area under consideration. This information shall be provided to the Division. Where no local fire suppression authority exists, needed fire suppression storage shall be assumed to be 120,000 gallons (1000 gpm for 2 hours).

(4) Emergency Storage.

Emergency storage shall be considered during the design process. The amount of emergency storage shall be based upon an assessment of risk and the desired degree of system dependability. The Executive Secretary may require emergency storage when it is warranted to protect public health and welfare.

R309-510-9. Distribution System Sizing.

(1) General Requirements.

The distribution system shall be designed to insure that minimum water pressures as required in R309-105-9 exist at all points within the system. If the distribution system is equipped with fire hydrants, the Division will require a letter from the local fire authority stating the fire flow and duration required of the area to insure the system shall be designed to provide minimum pressures as required in R309-105-9 to exist at all points within the system when needed fire flows are imposed upon the peak day demand flows of the system.

(2) Indoor Use, Estimated Peak Instantaneous Demand.

(a) For community water systems and large non-community systems, the peak instantaneous demand for each pipeline shall be assumed for indoor use as:

$Q = 10.8 \times N^{0.64}$

where N equals the total number of ERC's, and Q equals the total flow (gpm) delivered to the total connections served by that pipeline.

For Recreational Vehicle Parks, the peak instantaneous flow for indoor use shall be based on the following:

TABLE 510-6

Peak Instantaneous Demand for Recreational Vehicle Parks

Number of Connections	Formula
0 to 59	$Q = 4N$
60 to 239	$Q = 80 + 20N^{0.5}$
240 or greater	$Q = 1.6N$

NOTES FOR TABLE 510-6:

Q is total peak instantaneous demand (gpm) and N is the maximum number of connections. However, if the only water use is via service buildings the peak instantaneous demand shall be calculated for the number of fixture units as presented in Appendix E of the 2006 [~~2000~~] International Plumbing Code.

(b) For small non-community water systems the peak instantaneous demand to be estimated for indoor use shall be

calculated on a per-building basis for the number of fixture units as presented in Appendix E of the 2006 [~~2000~~] International Plumbing Code.

(3) Outdoor Use, Estimated Peak Instantaneous Demand.

Peak instantaneous demand to be estimated for outdoor use is given in Table 510-7. The procedure for determining the map zone and irrigated acreage for using Table 510-7 is outlined in Section R309-510-7(3).

TABLE 510-7

Peak Instantaneous Demand for Outdoor Use

Map Zone	Peak Instantaneous Demand (gpm/irrigated acre)
1	4.52
2	5.60
3	6.78
4	7.92
5	9.04
6	9.80

(4) Fire Flows.

(a) Distribution systems shall be designed to deliver needed fire flows if fire hydrants are provided. The design engineer shall consult with the local fire suppression authority regarding needed fire flows in the area under consideration. This information shall be provided to the Division. Where no local fire suppression authority exists, needed fire flows shall be assumed to be 1000 gpm unless the local planning commission provides a letter indicating that the system will not be required to provide any fire flows, in which case fire hydrants will not be allowed to be installed on any mains.

(b) If a distribution system is equipped with fire hydrants, the system shall be designed to insure that minimum pressures required by R309-105-9 exist at all points within the system when fire flows are added to the peak day demand of the system. Refer to Section R309-510-7 for information on determining the peak day demand of the system.

KEY: drinking water, minimum sizing, water conservation
Date of Enactment or Last Substantive Amendment: February, 2009 [~~March 8, 2006~~]
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

PROPOSED SUBSTANTIVE CHANGES
FOR
RULE R309-520

Recently staff reviewed current engineering and construction rules and make the following recommendations suggested by staff, contractors or others.

Staff found that the recent proposed non-substantive change to R309-520-11 which referred to the "Interim Standard – Ozonation, page xxxi" in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 1997 edition, and simply proposed the change in edition to 2007 was incorrect. Edition changes between 1997 and 2007 moved and expanded the Interim Standard to a full Part and Section.

Staff proposes the following amendment to R309-520-11, which proposes to make reference to Part 4, Section 4.3.7, Ozone, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 edition.

Staff Recommendation: Staff, believing that the above mentioned changes are substantive, asks the Board to review the proposed changes and, if they agree, authorize staff to start the rulemaking process and file the proposed rule amendments for publication in the Utah Bulletin of February 1, 2009.

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R309. Environmental Quality, Drinking Water.
R309-520. Facility Design and Operation: Disinfection.
R309-520-1. Purpose.

This rule specifies requirements for facilities which disinfect public drinking water. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-520-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-520-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-520-4. General.

Continuous disinfection shall be required of all ground water sources not consistently meeting standards of bacteriologic quality. Surface water sources or ground water sources under direct influence of surface water shall be disinfected during the course of required conventional surface water treatment or alternative surface water treatment. Disinfection shall not be considered a substitute for inadequate collection facilities. Systems having only sources classified as ground water (see R309-505-8) and which disinfect shall meet the requirements of R309-105-10(1).

R309-520-5. Allowable Primary Disinfectants.

Primary disinfection is defined as the means for providing adequate levels of inactivation of pathogenic micro organisms within the treatment process. Its effectiveness is measured through the "CT" values. Only four[~~three~~] disinfectants; chlorine (gaseous and liquid hypochlorites), ozone, ultraviolet light, and chlorine dioxide are allowable for primary disinfection.

R309-520-6. Allowable Secondary Disinfectants.

Secondary disinfection is intended to provide an adequate disinfectant residual in the distribution system to maintain the bacteriological quality of treated water. Its effectiveness is measured through maintaining a detectable disinfectant residual throughout the distribution system. Allowable disinfectants are chlorine (gaseous and liquid hypochlorites), chloramine, and chlorine dioxide.

R309-520-7. Appropriate Uses of Chemical Disinfectants.

Chemical disinfection alone is appropriate only for groundwater not under the influence of surface water. Surface water, or groundwater under the direct influence of surface water, shall be coagulated and filtered in addition to being disinfected. For criteria to be used in determining required levels of treatment refer to R309-200-5(7).

R309-520-8. Required Chemical Dosing and Contact Time.

Minimum levels for primary and secondary disinfection are specified in R309-200-5(7).

R309-520-9. Siting.

Disinfection installations shall be sited to permit convenient access through the entire year as well as considerations of safety (i.e. proximity to population or seismic fault zones).

R309-520-10. Chlorine.

(1) General Requirements for all Chlorination Installations.

(a) Chemical Types.

Disinfection by chlorination shall be accomplished by gaseous chlorine or liquid solutions of calcium or sodium hypochlorites.

(b) Feeding Equipment.

Solution-feed gas type chlorinators, direct-feed gas type chlorinators or hypochlorite liquid feeders of a positive displacement type shall be provided. Solution-feed gas type chlorinators are preferred. However, for small supplies requiring less than four pounds per day, liquid hypochlorinators are advised.

(c) Chlorine Feed Capacity.

The design of each chlorinator shall permit:

(i) the chlorinator capacity to be such that a free chlorine residual of at least 2 mg/l can be maintained in the system after 30 minutes of contact time during peak demand. The equipment shall be of such design that it will operate accurately over a feeding range of 0.2 mg/l to 2 mg/l.

(ii) assurance that a detectable residual, either combined or free, can be maintained at all times, at all points in the distribution system.

(d) Automatic Proportioning.

Automatic proportioning chlorinators shall be required where the rate of flow or chlorine demand is not reasonably constant.

(e) Injector/diffuser.

The chlorine solution injector/diffuser shall be compatible with the point of application to provide a rapid and thorough mix with all the water being treated. The center of a pipeline is the preferred application point.

(f) Contact Time and Point of Application.

(i) Due consideration shall be given to the contact time of the chlorine in water with relation to pH, ammonia, taste

producing substances, temperature, biological quality, and other pertinent factors.

(ii) Where possible, the design shall minimize the formation of chloro-organic compounds. At plants treating surface water or ground water under the direct influence of surface water, provisions shall be made for applying chlorine to raw water, applied water, filtered water, and water entering the distribution system.

(iii) When treating ground water, provisions shall be made for applying chlorine to at least a reservoir inlet or transmission pipeline which will provide maximum contact time.

(iv) Care must be taken to assure that the point of application will, in conjunction with the pipe and tank configuration of the water system, allow required CT values to be achieved prior to the first consumer connection.

(g) Minimization of Chlorinated Overflow.

The chlorinator and associated water delivery facilities shall be designed so as to minimize the unnecessary release of chlorinated water into the environment from tank overflows (see also rules of Division of Water Quality pertaining to discharge or pollution).

(h) Chlorinator Piping.

The chlorinator water supply piping shall be designed to prevent contamination of the treated water supply by sources of questionable quality. At all facilities treating surface water, pre- and post-chlorination systems shall be independent where solution water is not finished water. All chlorinator solution water shall be at least of equal quality to the water receiving the chlorine solution.

(i) Water Measurement.

A means to measure water flow to be treated shall be provided.

(j) Residual Testing Equipment.

Chlorine residual test equipment recognized in the latest edition of "Standard Methods for the Examination of Water and Wastewater" shall be provided and shall be capable of measuring residuals to the nearest 0.1 mg/l in the range below 0.5 mg/l, to the nearest 0.3 mg/l between 0.5 mg/l and 1.0 mg/l and to the nearest 0.5 mg/l above 1.0 mg/l.

(k) Standby and Backup Equipment.

A spare parts kit shall be provided and maintained for all chlorinators to repair parts subject to wear and breakage. If there is a large difference in feed rates between routine and emergency dosages, a gas metering tube shall be provided for each dose range to ensure accurate control of the chlorine feed. Where chlorination is required for protection of the supply, standby equipment of sufficient capacity shall be available to replace the largest unit. Standby power shall be available, during power outages, for operation of chlorinators where protection of the supply is required.

(l) Heating, Lighting, Ventilation.

Chlorinator houses shall be heated, lighted and ventilated as

necessary to assure proper operation of the equipment, and serviceability.

(m) Bypass Capability.

A chlorinator bypass shall be provided for periods during chlorinator servicing and power outages.

(2) Additional Requirement for Gas Chlorinators.

(a) Automatic Switch over.

Automatic Switch over of chlorine cylinders shall be provided, where necessary, to assure continuous disinfection.

(b) Injector.

Each injector shall be selected for the point of application with particular attention given to the quantity of chlorine to be added, the maximum injector waterflow, the total discharge back pressure, the injector operating pressure, and the size of the chlorine solution line. Gauges for measuring water pressure at the inlet and outlet of each injector shall be provided.

(c) Gas Scrubbers.

Gas chlorine facilities shall conform with the Uniform Fire Code, Article 80 and the Uniform Building Code, Chapter 9 as they are applied by local jurisdictions in the state. Furthermore, local toxic gas ordinances shall be complied with if they exist.

(d) Heat.

The design of the chlorination room shall assure that the temperature in the room will never fall below 32 degrees F or that temperature required for proper operation of the chlorinator, whichever is greater.

(e) Ventilation.

Chlorination equipment rooms which contain cylinders or equipment and lines with gaseous chlorine under pressure shall be vented such that:

(i) when fan(s) are operating, suction will provide one complete room air change per minute;

(ii) the ventilating fan(s) take suction near the floor, as far as practical from the door and air inlet, with the point of discharge so located as not to contaminate air inlets of any rooms or structures;

(iii) air inlets are through louvers near the ceiling;

(iv) louvers for chlorine room air intake and exhaust facilitate airtight closure;

(iv) separate switches for the fans and lights are outside of the room, at the entrance to the chlorination equipment room. Outside switches shall be protected from vandalism;

(v) vents from feeders and storage discharge above grade to the outside atmosphere; and

(vi) floor drains are discouraged. Where provided, the floor drains shall discharge to the outside of the building and shall not be connected to other internal or external drainage systems.

(f) Feeder Vent Hose.

The vent hose from the feeder shall discharge to the outside atmosphere above grade at a point least susceptible to vandalism and shall have the end covered with a No. 14 mesh non-corrodible

screen.

(g) Housing.

Adequate housing shall be provided for the chlorination equipment and for storing the chlorine (see R309-520-10(1)(l) above).

(h) Housing at Water Treatment Plants.

Separate rooms for cylinders and feed equipment shall be provided at all water treatment plants. Chlorine gas feed and storage shall be enclosed and separated from other operating areas. The chlorine room shall be:

(i) provided with a shatter resistant inspection window installed in an interior wall and preferably located so that an operator may read the weighing scales without entering the chlorine room,

(ii) constructed in a manner that all openings between the chlorine room and the remainder of the plant are sealed, and

(iii) provided with doors equipped with panic hardware assuring ready means of exit and opening only to the building exterior.

(i) Cylinder Security.

Full and empty cylinders of chlorine gas shall be:

(i) isolated from operating areas;

(ii) restrained in position to prevent upset from accidental bumping or a seismic event;

(iii) stored in rooms separated from ammonia storage; and

(iv) stored in areas not in direct sunlight or exposed to excessive heat.

(j) Feed Line Routing.

Chlorine feed lines shall not carry pressurized chlorine gas beyond the chlorinator room. Only vacuum lines may be routed to other portions of the building outside the chlorine room and any openings for these lines must be adequately sealed.

(k) Weighing Scales.

Scales shall be provided for weighing cylinders. Scales should be of a corrosion resistant material and should be placed in a location remote from any moisture. Scales shall be accurate enough to indicate loss of weight to the nearest one pound for 150 pound cylinders and to the nearest 10 pounds for one ton cylinders.

(l) Pressure Gauges.

Pressure gauges shall be provided on the inlet and outlet of each chlorine injector as indicated in R309-520-10(2)(b). The preferred location is on the water feed line immediately before the inlet of the chlorine injector and at a point on the water main just ahead of chlorine injection. These locations should give accurate pressure readings while not being subjected to corrosive chlorinated water.

(m) Injector Protection.

A suitable screen to prevent small debris from clogging a chlorine injector shall be provided on the water feed line. Provision for flushing of the screen is required.

(n) Chlorine Vent Line Protection.

A non-corrodible fine mesh (No. 14 or finer) screen shall be placed over the discharge ends of all vent lines. All vent lines shall discharge to the outside atmosphere above grade and at locations least susceptible to vandalism.

(o) Gas Masks.

(i) Respiratory protection equipment, meeting the requirements of the National Institute for Occupational Safety and Health (NIOSH) shall be available where chlorine gas in one-ton cylinders is handled, and shall be stored at a convenient location, but not inside any room where chlorine is used or stored. The units shall use compressed air, have at least a 30 minute capacity, and be compatible with or exactly the same as units used by the fire department responsible for the plant.

(ii) Where smaller chlorine cylinders are used, suitable gas masks must be provided.

(p) Chlorine Leak Detection and Repair.

A bottle of Ammonium Hydroxide, 56% ammonia solution, shall be available for chlorine leak detection; where ton containers are used, a leak repair kit approved by the Chlorine Institute shall be provided. Continuous chlorine leak detection equipment is recommended. Where a leak detector is provided, it shall be equipped with both an audible alarm and a warning light.

R309-520-11. Ozone.

Proposals for use of ozone disinfection shall be discussed with the Division prior to the preparation of final plans and specifications.

Part 4, Section 4.3.7, Ozone[~~Interim Standard Ozonation, page xxxi~~], in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007[~~1997~~] edition is hereby incorporated by reference and shall govern the design and operation of disinfection facilities utilizing ozone. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-520-12. Chlorine Dioxide.

Proposals for the use of Chlorine Dioxide as a disinfectant shall be discussed with the Division prior to the preparation of final plans and specifications. The "CT" values for the inactivation of Giardia cysts using chlorine dioxide are independent of pH, with only temperature affecting the value. For chlorine dioxide, a 3-log inactivation of Giardia cysts will generally result in greater than 4-log virus inactivation, and assure meeting requirements. However, for chlorine dioxide, unlike chlorine where this relationship always hold true, at certain temperatures, the 4-log virus CT may be higher than the 3-log Giardia cyst CT.

R309-520-13. Chloramines.

Proposals for the use of Chloramines as a disinfectant shall be discussed with the Division prior to the preparation of final

plans and specifications.

R309-520-14. Ultraviolet Light.

(1) Proposals for use of ultraviolet disinfection shall be discussed with the Division prior to the preparation of final plans and specifications.

(2) Secondary disinfection and maintenance of the required residual will be necessary where disinfection of the supply is required.

(3) Ultraviolet disinfection will be permitted where the design conforms to the minimum recommendations of the U.S. Public Health Service listed below.

(a) Ultraviolet radiation at a level of 2,537 Angstrom units must be applied at a minimum dosage of 16,000 microwatt-seconds per square centimeter per second (1,600 Finsen Units) at all points throughout the water disinfection chamber.

(b) Maximum water depth in the chamber, measured from the tub surface to the chamber wall, shall not exceed three inches.

(c) The ultraviolet tubes shall be:

(i) jacketed so that a proper operating tube temperature of about 105 degrees F is maintained; and

(ii) the jacket shall be of quartz or high silica glass with similar optical characteristics.

(d) A flow or time delay mechanism shall be provided to permit a two minute tube warm-up period before water flows from the unit.

(e) The unit shall be designed to permit frequent mechanical cleaning of the water contact surface of the jacket without disassembly of the unit.

(f) An automatic flow control valve, accurate within the expected pressure range, shall be installed to restrict flow to the maximum design flow of the treatment unit.

(g) An accurately calibrated ultraviolet intensity meter, properly filtered to restrict its sensitivity to the disinfection spectrum, shall be installed in the wall of the disinfection chamber at the point of greatest water depth from the tube or tubes.

(h) A diversion valve or automatic shut-off valve shall be installed which will permit flow into the finished drinking water system only when at least the minimum ultraviolet dosage is applied. When power is not being supplied to the unit, the valve should be in a closed position which prevents the flow of water into the finished drinking water system.

(i) An automatic, audible alarm shall be installed to warn of malfunction or impending shutdown.

(j) The materials of construction shall not impart toxic materials into the water either as a result of the presence of toxic constituents in materials of construction or as a result of physical or chemical changes resulting from exposure to ultraviolet energy.

(k) The unit shall be designed to protect the operator against electrical shock or excessive radiation.

(l) As with any drinking water treatment process, due consideration must be given to the reliability, economics, and competent operation of the disinfection process and related equipment, including:

(i) installation of the unit in a protected enclosure not subject to extremes of temperature which could cause malfunction; and

(ii) provision of a spare UV tube and other necessary equipment to effect prompt repair by qualified personnel properly instructed in the operation and maintenance of the equipment.

R309-520-15. Operation and Maintenance.

(1) Safety.

Chlorine gas facilities shall be operated in a manner which minimizes risks to water system personnel or the general public.

(2) Residual Chlorine.

Public drinking water systems supplied water from conventional surface water treatment or alternatives shall test for detectable chlorine residual or HPC within the distribution system as outlined in R309-215-10.

(3) Chlorine Dosing.

Chlorine, when used in the distribution system, shall be added in sufficient quantity to achieve either "breakpoint" and yield a detectable free chlorine residual or a detectable combined chlorine residual in the distribution system at points to be determined by the Executive Secretary. Residual checks must be taken daily by the operator of any system using disinfectants. The Executive Secretary may, however, reduce the frequency of residual checks if he determines that this would be an unwarranted hardship on the water system operator and, furthermore, the disinfection equipment has a verified record of reliable operation. Suppliers, when checking for residuals, must use test kits and methods which meet the requirements of the U.S. EPA. The "DPD" test method is recommended for free chlorine residuals. Information on the suppliers of this equipment is available from the Division.

(4) ANSI/NSF Standard 60 Certification.

All chemicals, including chlorine gas, added to drinking water supplied by a public water system shall be certified as complying with ANSI/NSF Standard 60, Drinking Water Treatment Chemicals.

KEY: drinking water, primary disinfectants, secondary disinfectants, operation and maintenance
Date of Enactment or Last Substantive Amendment: February, 2009 [~~August 15, 2000~~]
Notice of Continuation: March 13, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

PROPOSED SUBSTANTIVE CHANGES
FOR
RULE R309-525

Recently staff reviewed current engineering and construction rules and make the following recommendations suggested by staff, contractors or others.

Current rule wording requires overflows from day tanks to be routed so as to drain back to bulk storage tanks. In most applications around the State, staff has found that the common practice is to have the day tank and the bulk storage tank for most chemicals stored at the same elevation, thereby making it impossible to drain the overflow from a day tank back into the bulk storage tank. This is the case in water treatment plants as well as at individual well sites where fluoride is added to the water.

Staff proposes to add wording to the rule R309-525-11(8)(c)(v) to allow the overflows from day tanks or bulk storage tanks to be separated if spill containment is provided for both.

Staff Recommendation: Staff, believing that the above mentioned changes are substantive, asks the Board to review the proposed changes and, if they agree, authorize staff to start the rulemaking process and file the proposed rule amendments for publication in the Utah Bulletin of February 1, 2009.

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R309. Environmental Quality, Drinking Water.
R309-525. Facility Design and Operation: Conventional Surface Water Treatment.
R309-525-1. Purpose.

This rule specifies requirements for conventional surface water treatment plants used in public water systems. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-525-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-525-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-525-4. General.

(1) Treatment plants used for the purification of surface water supplies or ground water supplies under direct influence of surface water must conform to the requirements given herein. The plants shall have, as a minimum, facilities for flash mixing of coagulant chemicals, flocculation, sedimentation, filtration and disinfection.

(2) The overall design of a water treatment facility must be carefully examined to assure the compatibility of all devices and processes. The design of treatment processes and devices shall depend on an evaluation of the nature and quality of the particular water to be treated. The combined unit processes shall produce water meeting all established drinking water standards as given in R309-200.

(3) Direct filtration may be acceptable and rules governing this method are given in R309-530-5.

(4) Refer to R309-530-9 for policy with regards to novel water treatment equipment or techniques which may depart from the requirements outlined herein.

R309-525-5. Plant Capacity and Number of Treatment Trains.

(1) A determination of the required plant capacity and the required number of treatment trains shall be made after consultation with the Division. Ordinarily, a minimum of two units each for flocculation, sedimentation and filtration must be provided. The design shall provide for parallel or series operation of the clarification stages. Flash mix shall be

designed and operated to provide a minimum velocity gradient of 750 fps/ft. Mixing time shall be less than thirty seconds. The treatment plant shall be designed to meet the anticipated "peak day demand" of the system being served when the treatment plant is the system's sole source. When other sources are available to the system, this requirement may be relaxed.

(2) The degree of "back-up" required in a water treatment plant will vary with the number of connections to be served, the availability of other acceptable sources of water, and the ability to control water consumption. Thus, when other sources are available to the system, the requirements of R309-525-7 (Plant Reliability) may also be relaxed. The Division shall be consulted in this regard prior to plant design.

R309-525-6. Plant Siting.

Plants must be sited with due regard for earthquake, flood, and fire hazard. Assistance in this matter is available from the Utah Geologic Survey. The Division shall be consulted regarding site selection prior to the preparation of engineering plans and specifications.

R309-525-7. Plant Reliability.

Plants designed for processing surface water or ground water under direct influence of surface water shall be designed to meet present and future water demands and assure reliable operation at all times. To help assure proper, uninterrupted operation:

(1) A manual override shall be provided for any automatic controls. Highly sophisticated automation may put proper maintenance beyond the capability of the plant operator, leading to equipment breakdowns or expensive servicing. Adequate funding must be assured for maintenance of automatic equipment.

(2) Main switch electrical controls shall be located above grade, in areas not subject to flooding.

(3) Plants shall be operated by qualified personnel approved by the Executive Secretary. As a minimum, the treatment plant manager is required to be certified in accordance with R309-300 at the grade of the waterworks system with an appropriate unrestricted Utah Operator's Certificate.

(4) The plant shall be constructed to permit units to be taken out of service without disrupting operation, and with drains or pumps sized to allow dewatering in a reasonable period of time.

(5) The plant shall have standby power available to permit operation of essential functions during power outages,

(6) The plant shall be provided with backup equipment or necessary spare parts for all critical items.

(7) Individual components critical to the operation of a treatment plant shall be provided with anchorage to secure the components from loss due to an earthquake event.

R309-525-8. Color Coding and Pipe Marking.

The piping in water treatment plants shall be color coded for identification. The following table contains color schemes

recommended by the Division. Identification of the direction of flow and the contained liquid shall also be made on the pipe.

TABLE 525-1

Recommended Color Scheme for Piping

Water Lines	
Raw	Olive Green
Settled or Clarified	Aquamarine
Finished	Dark Blue
Chemical Lines	
Alum	Orange
Ammonia	White
Carbon Slurry	Black
Chorine (Gas and Solution)	Yellow
Fluoride	Light Blue with Red Band
Lime Slurry	Light Green
Potassium Permanganate	Violet
Sulfur Dioxide	Light Green with Yellow Band
Waste lines	
Backwash Waste	Light Brown
Sludge	Dark Brown
Sewer (Sanitary or Other)	Dark Gray
Other	
Compressed Air	Dark Green
Gas	Red
Other Lines	Light Gray

R309-525-9. Diversion Structures and Pretreatment.

Refer to R309-515-5(5) for diversion structure design.

R309-525-10. Presedimentation.

Waters containing, heavy grit, sand, gravel, leaves, debris, or a large volume of sediments may require pretreatment, usually sedimentation, with or without the addition of coagulation chemicals.

(1) Presedimentation basins shall be equipped for efficient sludge removal.

(2) Incoming water shall be dispersed across the full width of the line of travel as efficiently as practical. Short-circuiting shall be minimized.

(3) Provisions for bypassing presedimentation basins shall be included.

R309-525-11. Chemical Addition.

(1) Goals.

Chemicals used in the treatment of surface water shall achieve the following:

(a) Primary coagulant chemicals shall be utilized to permit

the formation of a floc,

(b) Disinfectants shall be added to raw and/or treated water.

(2) Application Criteria.

In achieving these goals the chemical(s) shall be applied to the water:

(a) To assure maximum control and flexibility of treatment,

(b) To assure maximum safety to consumer and operators,

(c) To prevent backflow or back-siphonage of chemical solutions to finished water systems.

(d) With appropriate spacing of chemical feed to eliminate any interference between chemicals.

(3) Typical Chemical Doses.

Chemical doses shall be estimated for each treatment plant to be designed. "Jar tests" shall be conducted on representative raw water samples to determine anticipated doses.

(4) Information Required for Review.

With respect to chemical applications, a submittal for Division review shall include:

(a) Descriptions of feed equipment, including maximum and minimum feed rates,

(b) Location of feeders, piping layout and points of application,

(c) Chemical storage and handling facilities,

(d) Specifications for chemicals to be used,

(e) Operating and control procedures including proposed application rates,

(f) Descriptions of testing equipment and procedures, and

(g) Results of chemical, physical, biological and other tests performed as necessary to define the optimum chemical treatment.

(5) Quality of Chemicals.

All chemicals added to water being treated for use in a public water system for human consumption shall comply with ANSI/NSF Standard 60. Evidence for this requirement shall be met if the chemical shipping container labels or material safety data sheets include:

(a) Chemical name, purity and concentrations, Supplier name and address, and

(b) Labeling indicating compliance with ANSI/NSF Standard 60.

(6) Storage, Safe Handling and Ventilation of Chemicals.

All requirements of the Utah Occupational Safety and Health Act (UOSHA) for storage, safe handling and ventilation of chemicals shall apply to public drinking water facilities. The designer shall incorporate all applicable UOSHA standards into the facility design, however, review of facility plans by the Division of Drinking Water under this Rule shall be limited to the following requirements:

(a) Storage of Chemicals.

(i) Space shall be provided for:

(A) An adequate supply of chemicals,

(B) Convenient and efficient handling of chemicals,

(C) Dry storage conditions.

(ii) Storage tanks and pipelines for liquid chemicals shall be specific to the chemicals and not for alternates.

(iii) Chemicals shall be stored in covered or unopened shipping containers, unless the chemical is transferred into a covered storage unit.

(iv) Liquid chemical storage tanks must:

(A) Have a liquid level indicator, and

(B) Have an overflow and a receiving basin or drain capable of receiving accidental spills or overflows, and meeting all requirements of R309-525-23, and

(C) Be equipped with an inverted "J" air vent.

(v) Acids shall be kept in closed acid-resistant shipping containers or storage units.

(b) Safe Handling.

(i) Material Safety Data Sheets for all chemicals utilized shall be kept and maintained in prominent display and be easily accessed by operators.

(ii) Provisions shall be made for disposing of empty bags, drums or barrels by an acceptable procedure which will minimize operator exposure to dusts.

(iii) Provisions shall be made for measuring quantities of chemicals used to prepare feed solutions.

(c) Dust Control and Ventilation.

Adequate provision shall be made for dust control and ventilation.

(7) Feeder Design, Location and Control.

(a) General Feeder Design.

General equipment design, location and control shall be such that:

(i) feeders shall supply, at all times, the necessary amounts of chemicals at an accurately controlled rate, throughout the anticipated range of feed,

(ii) chemical-contact materials and surfaces are resistant to the aggressiveness of the chemicals,

(iii) corrosive chemicals are introduced in a manner to minimize potential for corrosion,

(iv) chemicals that are incompatible are not fed, stored or handled together.

(v) all chemicals are conducted from the feeder to the point of application in separate conduits,

(vi) spare parts are available for all feeders to replace parts which are subject to wear and damage,

(vii) chemical feeders are as near as practical to the feed point,

(viii) chemical feeders and pumps operate at no lower than 20 percent of the feed range,

(ix) chemicals are fed by gravity where practical,

(x) be readily accessible for servicing, repair, and observation.

(b) Chemical Feed Equipment.

Where chemical feed is necessary for the protection of the consumer, such as disinfection, coagulation or other essential processes:

(i) a minimum of two feeders, one active and one standby, shall be provided for each chemical,

(ii) the standby unit or a combination of units of sufficient capacity shall be available to replace the largest unit during shut-downs,

(iii) where a booster pump is required, duplicate equipment shall be provided and, when necessary, standby power,

(iv) a separate feeder shall be used for each non-compatible chemical applied where a feed pump is required, and

(v) spare parts shall be available for all feeders to replace parts which are subject to wear and damage.

(c) Dry Chemical Feeders.

Dry chemical feeders shall:

(i) measure feed rate of chemicals volumetrically or gravimetrically, and

(ii) provide adequate solution water and agitation of the chemical in the solution tank.

(d) Feed Rate Control.

(i) Feeders may be manually or automatically controlled, with automatic controls being designed to allow override by manual controls.

(ii) Chemical feed rates shall be proportional to flows.

(iii) A means to measure water flow rate shall be provided.

(iv) Provisions shall be made for measuring the quantities of chemicals used.

(v) Weighing scales:

(A) shall be provided for weighing cylinders at all plants using chlorine gas,

(B) may be required for fluoride solution feed, where applicable,

(C) shall be provided for volumetric dry chemical feeders, and

(D) shall be accurate to measure increments of 0.5 percent of scale capacity.

(8) Feeder Appurtenances.

(a) Liquid Chemical Solution Pumps.

Positive displacement type solution feed pumps shall be used to feed liquid chemicals, but shall not be used to feed chemical slurries. Pumps must be sized to match or exceed maximum head conditions found at the point of injection. All liquid chemical feeders shall be provided with devices approved by the Utah Plumbing Code which will prevent the siphoning of liquid chemical through the pump.

(b) Solution Tanks.

(i) A means consistent with the nature of the chemical solution shall be provided in a solution tank to maintain a uniform strength of solution. Continuous agitation shall be provided to maintain slurries in suspension.

(ii) Means shall be provided to measure the solution level

in the tank.

(iii) Chemical solutions shall be kept covered. Large tanks with access openings shall have the openings curbed and fitted with tight overhanging covers.

(iv) Subsurface locations are discouraged, but when used for solution tanks shall:

(A) be free from sources of possible contamination, and

(B) assure positive drainage for ground waters, accumulated water, chemical spills and overflows.

(v) Overflow pipes, when provided, shall:

(A) have a free fall discharge, and

(B) be located where noticeable.

(vi) Acid storage tanks shall be vented to the outside atmosphere, but not through vents in common with day tanks.

(vii) Each tank shall be provided with a valved drain, protected against backflow in accordance with R309-525-11(10)(b) and R309-525-11(10)(c).

(viii) Solution tanks shall be located and protective curbing provided so that chemicals from equipment failure, spillage or accidental drainage shall not enter the water in conduits, treatment or storage basins.

(ix) When polymers are used, storage tanks shall be located away from heat sources and direct sunlight.

(c) Day Tanks.

(i) Day tanks shall be provided where dilution of liquid chemical is required prior to feeding.

(ii) Day tanks shall meet all the requirements of R309-525-11(9)(b).

(iii) Certain chemicals, such as polymers, become unstable after hydration, therefore, day tanks shall hold no more than a thirty hour supply unless manufacturer's recommendations allow for longer periods.

(iv) Day tanks shall be scale-mounted, or have a calibrated gauge painted or mounted on the side if liquid levels cannot be observed in a gauge tube or through translucent sidewalls of the tank. In opaque tanks, a gauge rod extending above a referenced point at the top of the tank, attached to a float may be used. The ratio of the cross-sectional area of the tank to its height must be such that unit readings are meaningful in relation to the total amount of chemical fed during a day.

(v) Hand pumps may be provided for transfer from a carboy or drum. A top rack may be used to permit withdrawal into a bucket from a spigot. Where motor-driven transfer pumps are provided a liquid level limit switch and an overflow from the day tank, which will drain by gravity back into the bulk storage tank, must be provided, unless spill containment is provided for both bulk and day tanks.

(vi) A means which is consistent with the nature of the chemical solution shall be provided to maintain uniform strength of solution in a day tank. continuous agitation shall be provided to maintain chemical slurries in suspension.

(vii) Tanks shall be properly labeled to designate the

chemical contained.

(d) Feed Lines.

(i) Feed lines shall be as short as possible in length of run, and be:

(A) of durable, corrosion resistant material,

(B) easily accessible throughout the entire length,

(C) protected against freezing, and

(D) readily cleanable.

(ii) Feed lines shall slope upward from the chemical source to the feeder when conveying gases.

(iii) Lines shall be designed with due consideration of scale forming or solids depositing properties of the water, chemical, solution or mixture conveyed.

(9) Make up Water Supply and Protection.

(a) In Plant Water Supply.

In plant water supply shall be:

(i) Ample in supply, adequate in pressure, and of a quality equal to or better than the water at the point of application.

(ii) Provided with means for measurement when preparing specific solution concentrations by dilution.

(iii) Properly protected against backflow.

(b) Cross-Connection Control.

Cross-connection control shall be provided to assure that:

(i) The make-up waterlines discharging to solution tanks shall be properly protected from backflow as required by the Utah Plumbing Code.

(ii) Liquid chemical solutions cannot be siphoned through solution feeders into the process units as required in R309-525-11(9)(c).

(iii) No direct connection exists between any sewer and the drain or overflow from the feeder, solution chamber or tank by providing that all pipes terminate at least six inches or two pipe diameters, whichever is greater, above the overflow rim of a receiving sump, conduit or waste receptacle.

(iv) Pre- and post-chlorination systems must be independent to prevent possible siphoning of partially treated water into the clear well. The water supply to each eductor shall have a separate shut-off valve. No master shut off valve will be allowed.

(c) Liquid Chemical Feeders, Siphon Control.

Liquid chemical feeders shall be such that chemical solutions cannot be siphoned into the process units, by:

(i) Assuring positive pressure at the point of discharge,

(ii) Providing vacuum relief,

(iii) Providing a suitable air gap, or

(iv) Other suitable means or combinations as necessary.

(10) Operator Safety.

Design of the plant shall be in accordance with the Utah Occupational Safety and Health Act (UOSHA). The designer and public water system management are responsible to see that they incorporate applicable UOSHA standards into the facility design and operation. Review of facility plans by the Division shall be

limited to the following recommendations:

(a) Floor surfaces should be smooth and impervious, slip-proof and well drained,

(b) At least one pair of rubber gloves, a dust respirator of a type certified by the National Institute of Occupational Safety and Health (NIOSH) for toxic dusts, an apron or other protective clothing and goggles or face mask should be provided for each operator, A deluge shower and/or eye washing device should be installed where strong acids and alkalis are used or stored.

(c) A water holding tank that will allow water to reach room temperature should be installed in the water line feeding the deluge shower and eye washing device. Other methods of water tempering may be available.

(d) Adequate ventilation should be provided.

(11) Design for Specific Chemicals.

Design of the plant shall be in accordance with the Utah Occupational Safety and Health Act (UOSHA). The designer and public water system management are responsible to see that they incorporate applicable UOSHA standards into the facility design and operation. Review of facility plans by the Division shall be limited to the following recommendations:

Acids and Caustics.

(i) Acids and caustics should be kept in closed corrosion-resistant shipping containers or storage units.

(ii) Acids and caustics should not be handled in open vessels, but should be pumped in undiluted form from original containers through suitable hose, to the point of treatment or to a covered day tank.

Sodium Chlorite for Chlorine Dioxide Generation.

Proposals for the storage and use of sodium chlorite should be approved by the Executive Secretary prior to the preparation of final plans and specifications. Provisions should be made for proper storage and handling of sodium chlorite to eliminate any danger of explosion.

(i) Sodium Chlorite Storage: (A) Sodium chlorite should be stored by itself in a separate room and preferably should be stored in an outside building detached from the water treatment facility. It should be stored away from organic materials which would react violently with sodium chlorite; (B) The storage structures should be constructed of noncombustible materials; (C) If the storage structure is to be located in a area where a fire may occur, water should be available to keep the sodium chlorite area sufficiently cool to prevent decomposition from heat and resultant potential explosive conditions.

(ii) Sodium Chlorite Handling: (A) Care should be taken to prevent spillage; (B) An emergency plan of operation should be available for the clean up of any spillage; (C) Storage drums should be thoroughly flushed prior to recycling or disposal.

(iii) Sodium Chlorite Feeders: (A) Positive displacement feeders should be provided; (B) Tubing for conveying sodium chlorite or chlorine dioxide solutions should be Type 1 PVC, polyethylene or materials recommended by the manufacturer; (C)

Feed lines should be installed in a manner to prevent formation of gas pockets and should terminate at a point of positive pressure; (D) Check valves should be provided to prevent the backflow of chlorine into the sodium chlorite line.

R309-525-12. Mixing.

(1) Flash Mix.

(a) Equipment - Mechanical, in-line or jet mixing devices shall be used.

(b) Mixing - All devices used in rapid mixing shall be capable of imparting a minimum velocity gradient (G) of at least 750 fps per foot. Mixing time shall be less than thirty seconds.

(c) Location - The flash mix and flocculation basins shall be as close together as possible.

(d) Introduction of chemicals - Primary coagulant chemicals shall be added at the point of maximum turbulence within the flash mix unit. Where in-line mixing devices are used chemical injection should be at the most appropriate upstream point.

(2) Flocculation.

(a) Basin design.

Inlet and outlet design shall prevent short-circuiting and destruction of floc. A drain or pumps shall be provided to handle dewatering and sludge removal.

(b) Detention.

The flow-through velocity shall not be less than 0.5 feet per minute nor greater than 1.5 feet per minute with a detention time for floc formation of at least 30 minutes.

(c) Equipment.

Agitators shall be driven by variable speed drives with the peripheral speed of paddles ranging from 0.5 fps to 2.0 fps. Equipment shall be capable of imparting a velocity gradient (G) between 25 fps per foot and 80 fps per foot to the water treated. Compartmentalized tapered energy flocculation concept may also be used in which G tapers from 100 fps to 10 fps per foot.

(d) Hydraulic flocculation.

Hydraulic flocculation may be permitted and shall be reviewed on a case by case basis. The unit must yield a G value equivalent to that required by b and c above.

(e) Piping.

Flocculation and sedimentation basins shall be as close as possible. The velocity of flocculated water through pipes or conduits to settling basins shall not be less than 0.5 fps nor greater than 1.5 fps. Allowance must be made to minimize turbulence at bends and changes in direction.

(f) Other designs.

Baffling may be used to provide for flocculation in small plants only after consultation with the Division. The design shall be such that the velocities and flows noted above will be maintained.

(g) Visible floc.

The flocculation unit shall be capable of producing a visible, settleable floc.

R309-525-13. Sedimentation.

(1) General Design Requirements.

Sedimentation shall follow flocculation. The detention time for effective clarification is dependent upon a number of factors related to basin design and the nature of the raw water. The following criteria apply to conventional sedimentation units:

(a) Inlet devices.

Inlets shall be designed to distribute the water equally and at uniform velocities. Open ports, submerged ports, or similar entrance arrangements are required. A baffle shall be constructed across the basin close to the inlet end and shall project several feet below the water surface to dissipate inlet velocities and provide uniform flows across the basin.

(b) Outlet devices.

Outlet devices shall be designed to maintain velocities suitable for settling in the basin and to minimize short-circuiting. The use of submerged orifices is recommended in order to provide a volume above the orifices for storage when there are fluctuations in the flow.

(c) Emergency Overflow.

An overflow weir (or pipe) shall be installed which will establish the maximum water level desired on top of the filters. It shall discharge by gravity with a free fall to a location where the discharge will be visible.

(d) Sludge Removal.

Sludge removal design shall provide that:

(i) sludge pipes shall be not less than three inches in diameter and arranged to facilitate cleaning,

(ii) entrance to sludge withdrawal piping shall prevent clogging,

(iii) valves shall be located outside the basin for accessibility, and

(iv) the operator may observe and sample sludge being withdrawn from the unit.

(v) Sludge collection shall be accomplished by mechanical means.

(e) Drainage.

Basins shall be provided with a means for dewatering. Basin bottoms shall slope toward the drain not less than one foot in 12 feet where mechanical sludge collection equipment is not provided.

(f) Flushing lines.

Flushing lines or hydrants shall be provided and shall be equipped with backflow prevention devices acceptable to the Executive Secretary.

(g) Safety.

Appropriate safety devices shall be included as required by the Occupational Safety and Health Act (OSHA).

(h) Removal of floating material.

Provision shall be made for the periodic removal of floating material.

(2) Sedimentation Without Tube Settlers.

If tube settling equipment is not used within settling basins, the following requirements apply:

(a) Detention Time.

A minimum of four hours of detention time shall be provided. Reduced sedimentation time may be approved when equivalent effective settling is demonstrated or multimedia filtration is employed.

(b) Weir Loading.

The rate of flow over the outlet weir shall not exceed 20,000 gallons per day per foot of weir length. Where submerged orifices are used as an alternate for overflow weirs they shall not be lower than three feet below the water surface when the flow rates are equivalent to weir loading.

(c) Velocity.

The velocity through settling basins shall not exceed 0.5 feet per minute. The basins shall be designed to minimize short-circuiting. Fixed or adjustable baffles shall be provided as necessary to achieve the maximum potential for clarification.

(d) Depth.

The depth of the sedimentation basin shall be designed for optimum removal.

(3) Sedimentation With Tube Settlers.

Proposals for settler unit clarification shall be approved by the Executive Secretary prior to the preparation of final plans and specifications.

(a) Inlet and outlet design shall be such to maintain velocities suitable for settling in the basin and to minimize short circuiting.

(b) Flushing lines shall be provided to facilitate maintenance and be properly protected against backflow or back siphonage. Drain and sludge piping from the settler units shall be sized to facilitate a quick flush of the settler units and to prevent flooding other portions of the plant.

(c) Although most units will be located within a plant, design of outdoor installations shall provide sufficient freeboard above the top of settlers to prevent freezing in the units.

(d) The design application rate shall be a maximum rate of 2 gal/sq.ft./min of cross-sectional area (based on 24-inch long 60 degree tubes or 39.5-inch long 7.5 degree tubes), unless higher rates are successfully shown through pilot plant or in-plant demonstration studies.

R309-525-14. Solids Contact Units.

(1) General.

Solids contact units are generally acceptable for combined softening and clarification where water characteristics, especially temperature, do not fluctuate rapidly, flow rates are uniform and operation is continuous. Before such units are considered as clarifiers without softening, specific approval of the Executive Secretary shall be obtained. A minimum of two units are required for surface water treatment.

(2) Installation of Equipment

The design engineer shall see that a representative of the manufacturer is present at the time of initial start-up operation to assure that the units are operating properly.

(3) Operation of Equipment.

The following shall be provided for plant operation:

(a) a complete outfit of tools and accessories,

(b) necessary laboratory equipment, and

(c) adequate piping with suitable sampling taps so located as to permit the collection of samples of water from critical portions of the units.

(4) Chemical feed.

Chemicals shall be applied at such points and by such means as to insure satisfactory mixing of the chemicals with the water.

(5) Mixing.

A flash mix device or chamber ahead of solids contact units may be required to assure proper mixing of the chemicals applied. Mixing devices employed shall be so constructed as to:

(a) provide good mixing of the raw water with previously formed sludge particles, and

(b) prevent deposition of solids in the mixing zone.

(6) Flocculation.

Flocculation equipment:

(a) shall be adjustable (speed and/or pitch),

(b) shall provide for coagulation in a separate chamber or baffled zone within the unit, and

(c) shall provide the flocculation and mixing period to be not less than 30 minutes.

(7) Sludge concentrators.

(a) The equipment shall provide either internal or external concentrators in order to obtain a concentrated sludge with a minimum of waste water.

(b) Large basins shall have at least two sumps for collecting sludge with one sump located in the central flocculation zone.

(8) Sludge removal.

Sludge removal design shall provide that:

(a) sludge pipes shall be not less than three inches in diameter and so arranged as to facilitate cleaning,

(b) the entrance to the sludge withdrawal piping shall prevent clogging,

(c) valves shall be located outside the tank for accessibility, and

(d) the operator may observe and sample sludge being withdrawn from the unit.

(9) Cross-connections.

(a) Blow-off outlets and drains shall terminate and discharge at places satisfactory to the Executive Secretary.

(b) Cross-connection control must be included for the finished drinking water lines used to back flush the sludge lines.

(10) Detention period.

The detention time shall be established on the basis of the raw water characteristics and other local conditions that affect

the operation of the unit. Based on design flow rates, the detention time shall be:

(a) two to four hours for suspended solids contact clarifiers and softeners treating surface water, and

(b) one to two hours for suspended solids contact softeners treating only ground water.

(11) Suspended slurry concentrate.

Softening units shall be designed so that continuous slurry concentrates of one percent or more, by weight, can be satisfactorily maintained.

(12) Water losses.

(a) Units shall be provided with suitable controls for sludge withdrawal.

(b) Total water losses shall not exceed:

(i) five percent for clarifiers,

(ii) three percent for softening units.

(c) Solids concentration of sludge bled to waste shall be:

(i) three percent by weight for clarifiers,

(ii) five percent by weight for softeners.

(13) Weirs or orifices.

The units shall be equipped with either overflow weirs or orifices constructed so that water at the surface of the unit does not travel over 10 feet horizontally to the collection trough.

(a) Weirs shall be adjustable, and at least equivalent in length to the perimeter of the basin.

(b) Weir loading shall not exceed:

(i) 10 gpm per foot of weir length for units used for clarifiers

(ii) 20 gpm per foot of weir length for units used for softeners.

(c) Where orifices are used the loading rates per foot of launderer shall be equivalent to weir loadings. Either shall produce uniform rising rates over the entire area of the tank.

(14) Upflow rates.

Upflow rates shall not exceed:

(a) 1.0 gpm/sf at the sludge separation line for units used for clarifiers,

(b) 1.75 gpm/sf at the slurry separation line for units used as softeners.

R309-525-15. Filtration.

(1) General.

Filters may be composed of one or more media layers. Mono-media filters are relatively uniform throughout their depth. Dual or multi-layer beds of filter material are so designed that water being filtered first encounters coarse material, and progressively finer material as it travels through the bed.

(2) Rate of Filtration.

(a) The rate of filtration shall be determined through consideration of such factors as raw water quality, degree of pretreatment provided, filter media, water quality control parameters, competency of operating personnel, and other factors

as determined by the Executive Secretary. Generally, higher filter rates can be assigned for the dual or multi-media filter than for a single media filter because the former is more resistant to filter breakthrough.

(b) The filter rate shall be proposed and justified by the designing engineer to the satisfaction of the Executive Secretary prior to the preparation of final plans and specifications.

(c) The use of dual or multi-media filters may allow a reduction of sedimentation detention time (see R309-525-13(2)(a)) due to their increased ability to store sludge.

(d) Filter rates assigned by the Executive Secretary must never be exceeded, even during backwash periods.

(e) The use of filter types other than conventional rapid sand gravity filters must receive written approval from the Executive Secretary prior to the preparation of final plans and specifications.

(3) Number of Filters Required.

At least two filter units shall be provided. Where only two filter units are provided, each shall be capable of meeting the plant design capacity (normally the projected peak day demand) at the approved filtration rate. Where more than two filter units are provided, filters shall be capable of meeting the plant design capacity at the approved filtration rate with one filter removed from service. Refer to R309-525-5 for situations where these requirements may be relaxed.

(4) Media Design.

R309-525-15(4)(a) through R309-525-15(4)(e), which follow, give requirements for filter media design. These requirements are considered minimum and may be made more stringent if deemed appropriate by the Executive Secretary.

(a) Mono-media, Rapid Rate Gravity Filters.

The allowable maximum filtration rate for a silica sand, mono-media filter is three gpm/sf This type of filter is composed of clean silica sand having an effective size of 0.35 mm to 0.65 mm and having a uniformity coefficient less than 1.7. The total bed thickness must not be less than 24 inches nor generally more than 30 inches.

(b) Dual Media, Rapid Rate Gravity Filters.

The following applies to all dual media filters:

(i) Total depth of filter bed shall not be less than 24 inches nor generally more than 30 inches.

(ii) All materials used to make up the filter bed shall be of such particle size and density that they will be effectively washed at backwash rates between 15 and 20 gpm/sf They must settle to reconstitute the bed essentially in the original layers upon completion of backwashing.

(iii) The bottom layer must be at least ten inches thick and consist of a material having an effective size no greater than 0.45 mm and a uniformity coefficient not greater than 1.5.

(iv) The top layer shall consist of clean crushed anthracite coal having an effective size of 0.45 mm to 1.2 mm, and a uniformity coefficient not greater than 1.5.

(v) Dual media filters will be assigned a filter rate up to six gpm/sf. Generally if the bottom fine layer consists of a material having an effective size of 0.35 mm or less, a filtration rate of six gpm/sf can be assigned.

(vi) Each dual media filter must be provided with equipment which shall continuously monitor turbidity in the filtered water. The equipment shall be so designed to initiate automatic backwash if the filter effluent turbidity exceeds 0.3 NTU. If the filter turbidity exceeds one NTU, filter shutdown is required. In plants attended part-time, this shutdown must be accomplished automatically and shall be accompanied by an alarm. In plants having full-time operators, a one NTU condition need only activate an alarm. Filter shutdown may then be accomplished by the operator.

(c) Tri-Media, Rapid Rate Gravity Filters.

The following applies to all Tri-media filters:

(i) Total depth of filter bed shall not be less than 24 inches nor generally more than 30 inches.

(ii) All materials used to make up the filter bed shall be of such particle size and density that they will be effectively washed at backwash rates between 15 and 20 gpm/sf. They must settle to reconstitute the bed to the normal gradation of coarse to fine in the direction of flow upon completion of backwashing.

(iii) The bottom layer must be at least four inches thick and consist of a material having an effective size no greater than 0.45 mm and uniformity coefficient not greater than 2.2. The bottom layer thickness may be reduced to three inches if it consists of a material having an effective size no greater than 0.25 mm and a uniformity coefficient not greater than 2.2.

(iv) The middle layer must consist of silica sand having an effective size of 0.35 mm to 0.8 mm, and a uniformity coefficient not greater than 1.8.

(v) The top layer shall consist of clean crushed anthracite coal having an effective size of 0.45 mm to 1.2 mm, and a uniformity coefficient not greater than 1.85.

(vi) Tri-media filters will be assigned a filter rate up to 6 gpm/sf. Generally, if the bottom fine layer consists of a material having an effective size of 0.35 mm or less, a filtration rate of six gpm/sf can be assigned.

(vii) Each Tri-media filter must be provided with equipment which shall continuously monitor turbidity in the filtered water. The equipment shall be so designed to initiate automatic backwash if the effluent turbidity exceeds 0.3 NTU. If the filter turbidity exceeds one NTU, filter shutdown is required. In plants attended part-time, this shutdown must be accomplished automatically and shall be accompanied by an alarm. In plants having full-time operators, a one NTU condition need only activate an alarm. Filter shutdown may then be accomplished by the operator.

(d) Granulated Activated Carbon (GAC).

Use of granular activated carbon media shall receive the prior approval of the Executive Secretary, and must meet the basic

specifications for filter material as given above, and:

(i) There shall be provision for adding a disinfectant to achieve a suitable residual in the water following the filters and prior to distribution,

(ii) There shall be a means for periodic treatment of filter material for control of biological or other growths,

(iii) Facilities for carbon regeneration or replacement must be provided.

(e) Other Media Compositions and Configurations.

Filters consisting of materials or configurations not prescribed in this section will be considered on experimental data or available operation experience.

(5) Support Media, Filter Bottoms and Strainer Systems.

Care must be taken to insure that filter media, support media, filter bottoms and strainer systems are compatible and will give satisfactory service at all times.

(a) Support Media.

The design of support media will vary with the configuration of the filtering media and the filter bottom. Thus, support media and/or proprietary filter bottoms shall be reviewed on a case-by-case basis.

(b) Filter Bottoms and Strainer Systems.

(i) The design of manifold type collection systems shall:

(A) Minimize loss of head in the manifold and laterals,

(B) Assure even distribution of washwater and even rate of filtration over the entire area of the filter,

(C) Provide a ratio of the area of the final openings of the strainer system to the area of the filter of about 0.003,

(D) Provide the total cross-sectional area of the laterals at about twice the total area of the final openings,

(E) Provide the cross-sectional area of the manifold at 1.5 to 2 times the total area of the laterals.

(ii) Departures from these standards may be acceptable for high rate filter and for proprietary bottoms.

(iii) Porous plate bottoms shall not be used where calcium carbonate, iron or manganese may clog them or with waters softened by lime.

(6) Structural Details and Hydraulics.

The filter structure shall be so designed as to provide for:

(a) Vertical walls within the filter,

(b) No protrusion of the filter walls into the filter media,

(c) Cover by superstructure,

(d) Head room to permit normal inspection and operation,

(e) Minimum water depth over the surface of the filter media of three feet, unless an exception is granted by the Executive Secretary,

(f) Maximum water depth above the filter media shall not exceed 12 feet,

(g) Trapped effluent to prevent backflow of air to the bottom of the filters,

(h) Prevention of floor drainage to enter onto the filter by installation of a minimum four inch curb around the filters,

(i) Prevention of flooding by providing an overflow or other means of control,

(j) Maximum velocity of treated water in pipe and conduits to filters of two fps,

(k) Cleanouts and straight alignment for influent pipes or conduits where solids loading is heavy or following lime-soda softening,

(l) Washwater drain capacity to carry maximum flow,

(m) Walkways around filters, to be not less than 24 inches wide,

(n) Safety handrails or walls around filter areas adjacent to normal walkways,

(o) No common wall between filtered and unfiltered water shall exist. This requirement may be waived by the Executive Secretary for small "package" type plants using metal tanks of sufficient thickness,

(p) Filtration to waste for each filter.

(7) Backwash.

(a) Water Backwash Without Air.

Water backwash systems shall be designed so that backwash water is not recycled to the head of the treatment plant unless it has been settled, as a minimum. Furthermore, water backwash systems; including tanks, pumps and pipelines, shall:

(i) Provide a minimum backwash rate of 15 gpm/sf, consistent with water temperatures and the specific gravity of the filter media. The design shall provide for adequate backwash with minimum media loss. A reduced rate of 10 gpm/sf may be acceptable for full depth anthracite or granular activated carbon filters.

(ii) provide finished drinking water at the required rate by washwater tanks, a washwater pump, from the high service main, or a combination of these.

(iii) Permit the backwashing of any one filter for not less than 15 minutes.

(iv) Be capable of backwashing at least two filters, consecutively.

(v) Include a means of varying filter backwash rate and time.

(vi) Include a washwater regulator or valve on the main washwater line to obtain the desired rate of filter wash with washwater valves or the individual filters open wide.

(vii) Include a rate of flow indicator, preferably with a totalizer on the main washwater line, located so that it can be easily read by the operator during the washing process.

(viii) Be designed to prevent rapid changes in backwash water flow.

(ix) Use only finished drinking water.

(x) Have washwater pumps in duplicate unless an alternate means of obtaining washwater is available.

(xi) Perform in conjunction with "filter to waste" system to allow filter to stabilize before introduction into clearwell.

(b) Backwash with Air Scouring.

Air scouring can be considered in place of surface wash when:

(i) air flow for air scouring the filter must be 3 to 5 scfm/sf of filter area when the air is introduced in the underdrain; a lower air rate must be used when the air scour distribution system is placed above the underdrains,

(ii) a method for avoiding excessive loss of the filter media during backwashing must be provided,

(iii) air scouring must be followed by a fluidization wash sufficient to restratify the media,

(iv) air must be free from contamination,

(v) air scour distribution systems shall be placed below the media and supporting bed interface; if placed at the interface the air scour nozzles shall be designed to prevent media from clogging the nozzles or entering the air distribution system.

(vi) piping for the air distribution system shall not be flexible hose which will collapse when not under air pressure and shall not be a relatively soft material which may erode at the orifice opening with the passage of air at high velocity.

(vii) air delivery piping shall not pass down through the filter media nor shall there be any arrangement in the filter design which would allow short circuiting between the applied unfiltered water and the filtered water,

(viii) consideration shall be given to maintenance and replacement of air delivery piping,

(ix) when air scour is provided the backwash water rate shall be variable and shall not exceed eight gpm/sf unless operating experience shows that a higher rate is necessary to remove scoured particles from filter surfaces.

(x) the filter underdrains shall be designed to accommodate air scour piping when the piping is installed in the underdrain, and

(xi) the provisions of Section R309-525-15(7)(a) (Backwash) shall be followed.

(8) Surface Wash or Subsurface Wash.

Surface wash or subsurface wash facilities are required except for filters used exclusively for iron or manganese removal. Washing may be accomplished by a system of fixed nozzles or a revolving-type apparatus, provided:

(a) Provisions for water pressures of at least 45 psi,

(b) A properly installed vacuum breaker or other approved device to prevent back-siphonage if connected to a finished drinking water system,

(c) All washwater must be finished drinking water,

(d) Rate of flow of two gpm/sf of filter area with fixed nozzles or 0.5 gpm/sf with revolving arms.

(9) Washwater Troughs.

Washwater troughs shall be so designed to provide:

(a) The bottom elevation above the maximum level of expanded media during washing,

(b) A two inch freeboard at the maximum rate of wash,

(c) The top edge level and all edges of trough at the same elevation

(d) Spacing so that each trough serves the same number of

square feet of filter areas,

(e) Maximum horizontal travel of suspended particles to reach the trough not to exceed three feet.

(10) Appurtenances.

(a) The following shall be provided for every filter:

(i) Sample taps or means to obtain samples from influent and effluent,

(ii) A gauge indicating loss of head,

(iii) A meter indicating rate-of-flow. A modified rate controller which limits the rate of filtration to a maximum rate may be used. However, equipment that simply maintains a constant water level on the filters is not acceptable, unless the rate of flow onto the filter is properly controlled,

(iv) A continuous turbidity monitoring device where the filter is to be loaded at a rate greater than three gpm/sf

(v) Provisions for draining the filter to waste with appropriate measures for backflow prevention (see R309-525-23).

(i) Wall sleeves providing access to the filter interior at several locations for sampling or pressure sensing,

(ii) A 1.0 inch to 1.5 inch diameter pressure hose and storage rack at the operating floor for washing filter walls.

(11) Miscellaneous.

Roof drains shall not discharge into filters or basins and conduits preceding the filters.

R309-525-16. In-Plant Finished Drinking Water Storage.

(1) General.

In addition to the following, the applicable design standards of R309-545 shall be followed for plant storage.

(a) Backwash Water Tanks.

Backwash water tanks shall be sized, in conjunction with available pump units and finished water storage, to provide the backwash water required by R309-525-15(7). Consideration shall be given to the backwashing of several filters in rapid succession.

(b) Clearwell.

Clearwell storage shall be sized, in conjunction with distribution system storage, to relieve the filters from having to follow fluctuations in water use.

(i) When finished water storage is used to provide the contact time for chlorine (see R309-520-10(1)(f), especially sub-section (f)(iv)), special attention must be given to size and baffling.

(ii) To ensure adequate chlorine contact time, sizing of the clearwell shall include extra volume to accommodate depletion of storage during the nighttime for intermittently operated filtration plants with automatic high service pumping from the clearwell during non-treatment hours.

(iii) An overflow and vent shall be provided.

(2) Adjacent Compartments.

Finsihed drinking water shall not be stored or conveyed in a compartment adjacent to unsafe water when the two compartments are separated by a single wall. The Executive Secretary may grant an

exception to this requirement for small "package" treatment plants using metal tanks of sufficient wall thickness.

(3) Basins and Wet-Wells.

Receiving basins and pump wet-wells for finished drinking water shall be designed as drinking water storage structures. (See Section R309-545)

R309-525-17. Miscellaneous Plant Facilities.

(1) Laboratory.

Sufficient laboratory equipment shall be provided to assure proper operation and monitoring of the water plant. A list of required laboratory equipment is:

(a) one floc testing apparatus with illuminated base and variable speed stirrer,

(b) 10 each 1000 ml Griffin beakers (plastic is highly recommended over glass to prevent breakage),

(c) one 1000 ml graduated cylinder (plastic is highly recommended over glass to prevent breakage),

(d) pH test strips (6.0 to 8.5),

(e) five wide mouth 25 ml Mohr pipets,

(f) one triple beam, single pan or double pan balance with 0.1 g sensitivity and 2000 g capacity (using attachment weights),

(g) DPD chlorine test kit,

(h) bench-top turbidimeter,

(i) five each 1000 ml reagent bottles with caps,

(j) dish soap,

(k) brush (2 3/4 inch diameter by 5 inch),

(l) one platform scale 1/2 lb sensitivity, 100 lb capacity,

(m) book - Simplified Procedures for Water Examination, AWWA Manual M12

(2) Continuous Turbidity Monitoring and Recording Equipment.

Continuous turbidity monitoring and recording facilities shall be located as specified in R309-215-9.

(3) Sanitary and Other Conveniences.

All treatment plants shall be provided with finished drinking water, lavatory and toilet facilities unless such facilities are otherwise conveniently available. Plumbing must conform to the Utah Plumbing Code and must be so installed to prevent contamination of a public water supply.

R309-525-18. Sample Taps.

Sample taps shall be provided so that water samples can be obtained from appropriate locations in each unit operation of treatment. Taps shall be consistent with sampling needs and shall not be of the petcock type. Taps used for obtaining samples for bacteriological analysis shall be of the smooth-nosed type without interior or exterior threads, shall not be of the mixing type, and shall not have a screen, aerator, or other such appurtenance.

R309-525-19. Operation and Maintenance Manuals.

Operation and maintenance manuals shall be prepared for the treatment plant and found to be acceptable by the Executive

Secretary. The manuals shall be usable and easily understood. They shall describe normal operating procedures, maintenance procedures and emergency procedures.

R309-525-20. Operator Instruction.

Provisions shall be made for operator instruction at the start-up of a plant.

R309-525-21. Safety.

All facilities shall be designed and constructed with due regard for safety, comfort and convenience. As a minimum, all applicable requirements of Utah Occupational Safety and Health Act (UOSHA) must be adhered to.

R309-525-22. Disinfection Prior To Use.

All pipes, tanks, and equipment which can convey or store finished drinking water shall be disinfected in accordance with the following AWWA procedures:

(1) C651-05 Disinfecting Water Mains
(2) C652-02 Disinfection of Water Storage Facilities
(3) C653-03 Disinfection of Water Treatment Plants

R309-525-23. Disposal of Treatment Plant Waste.

Provisions must be made for proper disposal of water treatment plant waste such as sanitary, laboratory, sludge, and filter backwash water. All waste discharges and treatment facilities shall meet the requirements of the plumbing code, the Utah Department of Environmental Quality, the Utah Department of Health, and the United States Environmental Protection Agency, including the following:

(1) Rules for Onsite Wastewater Disposal Systems, Utah Administrative Code R317-4.

(2) Rules for Water Quality, Utah Administrative Code R317.

(3) Rules for Solid and Hazardous Waste, Utah Administrative Code R315.

In locating waste disposal facilities, due consideration shall be given to preventing potential contamination of a water supply as well as breach or damage due to environmental factors.

R309-525-24. Other Considerations.

Consideration shall be given to the design requirements of other federal, state, and local regulatory agencies for items such as safety requirements, special designs for the handicapped, plumbing and electrical codes, construction in the flood plain, etc.

R309-525-25. Operation and Maintenance.

(1) Water system operators must determine that all chemicals added to water intended for human consumption are suitable for drinking water use and comply with ANSI/NSF Standard 60.

(2) No chemicals or other substances may be added to public water supplies unless the chemical addition facilities and

chemical type have been reviewed and approved by the Executive Secretary. The Executive Secretary shall be notified prior to the changing of primary coagulant type. The Executive Secretary may require documentation to verify that sufficient testing and analysis have been done. The primary coagulant may not be changed without prior approval from the Executive Secretary.

(3) During the operation of a conventional surface water treatment plant stable flow rates shall be maintained through the filters.

(4) All instrumentation needed to verify that treatment processes are sufficient shall be properly calibrated and maintained. As a minimum, this shall include turbidimeters.

KEY: drinking water, flocculation, sedimentation, filtration
Date of Enactment or Last Substantive Amendment: February, 2009 [~~December 9, 2002~~]
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PROPOSED SUBSTANTIVE CHANGES
FOR
RULE R309-530

Recently staff reviewed current engineering and construction rules and make the following recommendations suggested by staff, contractors or others.

Staff questioned wording in R309-530-6(5)(c) indicating filtration rates between 0.03 gpm/sf and 0.01 gpm/sf would be acceptable for slow sand filtration plants, suggesting that the numbers should be 0.03 and 0.1.

In reviewing previous requirements and texts, filtration rates between 2 million gallons per day per acre and 6 million gallons per day per acre are considered acceptable. These latter numbers are repeated in the rule, enclosed in brackets. When 2 and 6 million gallons per day per acre are converted to gpm per square foot, the numbers are 0.03188 and 0.09565 respectively. Since these round to 0.03 and 0.1 staff feel there is a need to correct the present rule.

Slow Sand Filtration Studies have been conducted at hydraulic loading rates of 0.04, 0.12, and 0.4 meters/hour. These numbers convert to 2.565, 3.078, and 10.263 million gallons per day per acre, therefore the 2 to 6 million gallons per day per acre is conservative.

Staff Recommendation: Staff, believing that the above mentioned changes are substantive, asks the Board to review the proposed changes and, if they agree, authorize staff to start the rulemaking process and file the proposed rule amendments for publication in the Utah Bulletin of February 1, 2009.

R309. Environmental Quality, Drinking Water.
R309-530. Facility Design and Operation: Alternative Surface Water Treatment Methods.
R309-530-1. Purpose.

This rule specifies requirements for alternative surface water treatment methods. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-530-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-530-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-530-4. General.

(1) Alternative Methods.

In addition to conventional surface water treatment method (i.e. coagulation, sedimentation and filtration as outlined in R309-525), several alternative methods may also be suitable. They are: Direct Filtration; Slow Sand Filtration; Membrane Filtration; and Diatomaceous Earth Filtration.

(2) Incorporation of Other Rules.

For each process described in this section pertinent rules are given. The designer shall also incorporate the relevant rules given in other sections into the plans and specifications for any of these specialized treatment methods. Where applicable, the following topics shall be addressed:

(a) Plant Siting (see R309-525-6).
(b) Pre-design Submittal (see R309-515-5(2)).
(c) Plant Reliability (see R309-525-7).
(d) Color Coding and Pipe Marking (see R309-525-8).
(e) Chemical Addition (see R309-525-11).
(f) Miscellaneous Plant Facilities (see R309-525-17, particularly sub-section R309-525-17(1), Laboratory).
(g) Operation and Maintenance Manuals (see R309-525-19).
(h) Safety (see R309-525-21).
(i) Disposal of Treatment Plant Waste (see R309-525-23).
(j) Disinfection (see R309-520).

R309-530-5. Direct Filtration.

(1) Chemical Addition and Mixing.

Direct Filtration is conventional surface water treatment without the sedimentation process. Rules for Chemical Addition and Mixing shall be the same as found in sections R309-525-11 and R309-525-12.

(2) Source Water Quality.

Direct Filtration applies the destabilized colloids to the filter rather than removing the majority of the load through sedimentation. While this process represents considerable construction cost savings, the source water must have low average turbidity in order to provide reliable service without excessive backwash requirements. Source water with low average turbidity is generally only obtained from large capacity reservoirs.

(3) Design Requirements.

The following requirements shall apply to Direct Filtration plants:

(a) At least one year's record of source water turbidity, sampled at least once per week, shall be presented to the Executive Secretary. A Direct Filtration facility will only be permitted if the data shows that 75% of the measurements are below five (5) NTU. The Executive Secretary shall judge whether Direct Filtration is suitable given the quality of the proposed source water (see R309-515-5(2)(a)(ii)).

(b) Pilot plant studies, acceptable to the Executive Secretary, shall be conducted prior to the preparation of final engineering plans.

(c) Requirements for flash mix and flocculation basin design are given in sub-sections R309-525-12(1) and R309-525-12(2).

(d) Chemical addition and mixing equipment shall be designed to be capable of providing a visible, but not necessarily settleable, floc.

(e) Surface wash, subsurface wash, or air scour shall be provided for the filters in accordance with sub-section R309-525-15(7).

(f) A continuous monitoring turbidimeter shall be installed on each filter effluent line and shall be of a type with at least two alarm conditions capable of meeting the requirements of subsections R309-525-15(4)(b)(vi) or R309-525-15(4)(c)(vii). The combined plant effluent shall be equipped with a continuous turbidimeter having a chart recorder. Additional monitoring equipment to assist in control of the coagulant dose may be required (i.e. streaming current gauges, particle counters, etc.) if the plant cannot consistently meet the requirements of rule R309-200.

(g) In addition to the alarm conditions required above, the plant shall be designed and operated so that the plant will automatically shut down when a source water turbidity of 20 NTU lasts longer than three hours, or when the source water turbidity exceeds 30 NTU at any time.

(h) The plant design and land ownership surrounding the plant shall allow for the installation of conventional sedimentation basins. Sedimentation basins may be required if the Executive Secretary determines the plant is failing to meet

minimum water quality or performance standards.

R309-530-6. Slow Sand Filtration.

(1) Acceptability.

Slow sand filtration means a process involving passage of raw water through a bed of sand at low velocity resulting in substantial particle removal by physical and biological mechanisms. The acceptability of slow sand filters as a substitute for "conventional surface water treatment" facilities (detailed in R309-525) shall be determined by the Executive Secretary based on suitability of the source water and demand characteristics of the system.

(2) Source Water Quality.

The Executive Secretary may impose design requirements in addition to those listed herein, in allowing this process. The following shall be considered, among other factors, in determining whether slow sand filtration will be acceptable:

(a) Source water turbidity must be low and consistent. Slow Sand Filtration shall be utilized only when the source waters have turbidity less than 50 NTU and color less than 30 units (see R309-515-5(2)(a)).

(b) The nature of the turbidity particles shall be considered. Turbidity must not be attributable to colloidal clay.

(c) The nature and extent of algae growths in the raw water shall be considered. Algae must not be a species considered as filter and screen-clogging algae as indicated in "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. High concentrations of algae in the raw water can cause short filter runs; the amount of algae, expressed as the concentration of chlorophyll "a" in the raw water shall not exceed 0.005 mg/l.

(3) Pilot Plant Studies.

The Executive Secretary shall allow the use of Slow Sand Filtration only when the supplier's engineering studies show that the slow sand facility can consistently produce an effluent meeting the quality requirements of rule R309-200. The Executive Secretary should be consulted prior to the detailed design of a slow sand facility.

(4) Operation.

Effluent from a Slow Sand Filtration facility shall not be introduced into a public water supply until an active biological mat has been created on the filter.

(5) Design requirements.

The following design parameters shall apply to each Slow Sand Filtration plant:

(a) At least three filter units shall be provided. Where only three units are provided, any two shall be capable of meeting the plant's design capacity (normally the projected "peak daily flow") at the approved filtration rate. Where more than three filter units are provided, the filters shall be capable of meeting the plant design capacity at the approved filtration rate with any

one filter removed from service.

(b) All filters shall be protected to prevent freezing. If covered by a structure, enough headroom shall exist to permit normal movement by operating personnel for scraping and sand removal operations. There shall be adequate manholes and access ports for the handling of sand. An overflow at the maximum filter water level shall be provided.

(c) The permissible rates of filtration shall be determined by the quality of the source water and shall be determined by experimental data derived during pilot studies conducted on the source water. Filtration rates of 0.03 gpm/sf to 0.1 [~~0.01~~] gpm/sf shall be acceptable (equivalent to two to six million gallons per day per acre). Somewhat higher rates may be acceptable when demonstrated to the satisfaction of the Executive Secretary.

(d) Each filter unit shall be equipped with a main drain and an adequate number of lateral underdrains to collect the filtered water. The underdrains shall be so spaced that the maximum velocity of the water flow in the underdrain will not exceed 0.75 fps. The maximum spacing of the laterals shall not exceed three feet if pipe laterals are used.

(e) Filter sand shall be placed on graded gravel layers for an initial filter sand depth of 30 inches. A minimum of 24 inches of filter sand shall be present, even after scraping. The effective size of the filter sand shall be between 0.30 mm and 0.45 mm in diameter. The filter sand uniformity coefficient shall not exceed 2.5. Further, the sand shall throughly washed and found to be clean and free from foreign matter.

(f) A three-inch layer of well rounded sand shall be used as a supporting media for filter sand. It shall have an effective size of 0.8 mm to 2.0 mm in diameter and the uniformity coefficient shall not be greater than 1.7.

(g) A supporting gravel media shall be provided. It shall consist of hard, durable, rounded silica particles and shall not include flat or elongated particles. The coarsest gravel shall be 2.5 inches in size when the gravel rests directly on the strainer system, and must extend above the top of the perforated laterals. Not less than four layers of gravel shall be provided in accordance with the following size and depth distribution when used with perforated laterals:

TABLE 530-1

Size	Depth
2 1/2 to 1 1/2 inches	5 to 8 inches
1 1/2 to 3/4 inches	3 to 5 inches
3/4 to 1/2 inches	3 to 5 inches
1/2 to 3/16 inches	2 to 3 inches
3/16 to 3/32 inches	2 to 3 inches

Reduction of gravel depths may be considered upon justification to the Executive Secretary when proprietary filter bottoms are specified.

(h) Slow sand filters shall be designed to provide a depth of at least three to five feet of water over the sand.

(i) Each filter shall be equipped with: a loss of head gauge; an orifice, venturi meter, or other suitable metering device installed on each filter to control the rate of filtration; and an effluent pipe designed to maintain the water level above the top of the filter sand.

(j) Disinfection of the effluent of Slow Sand Filtration plants will be required.

(k) A filter-to-waste provision shall be included.

(l) Electrical power shall be available at the plant site.

R309-530-7. Diatomaceous Earth Filtration.

The use of Diatomaceous Earth Filtration units may be considered for application to surface waters with low turbidity and low bacterial contamination, and additionally may be used for iron removal for groundwaters of low quality, providing the removal is effective and the water is of sanitary quality before treatment.

The acceptability of Diatomaceous Earth Filtration as a substitute for "conventional surface water treatment" facilities (detailed in rule R309-525) shall be determined by the Executive Secretary. Determination may be based on the level of support previously exhibited by the public water system management along with a finding by the Executive Secretary that "conventional surface water treatment" or other methods herein described are too costly or unacceptable.

Diatomaceous Earth Filtration consists of a process to remove particles from water wherein a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the source water to maintain the permeability of the filter cake. Diatomite filters are characterized by rigorous operating requirements, high operating costs, and increased sludge production.

Part 4, Section 4.2.3, Diatomaceous Earth Filtration, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 edition is hereby incorporated by reference and shall govern the design and operation of diatomaceous earth filtration facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-530-8. Membrane Technology.

(1) Acceptability.

Surface waters, or groundwater under the direct influence of surface water (UDI), may be treated using membrane technology (microfiltration, ultrafiltration, nanofiltration) coupled with "primary and secondary disinfection."

(2) Pilot Plant Study.

Because this is a relatively new technology, appropriate investigation shall be conducted by the public water system to assure that the process will produce the required quality of water at a cost which can be borne by the public water system consumers. A pilot plant study shall be conducted prior to the commencement of design. The study must be conducted in accordance with EPA's Environmental Technology Verification Program (ETV) or the protocol and treated water parameters must be approved prior to conducting any testing by the Executive Secretary.

(3) Design Requirements.

The following items shall be addressed in the design of any membrane technology plant intended to provide microbiological treatment of surface waters or groundwater "UDI:"

(a) The facility shall be equipped with an on-line particle counter on the final effluent.

(b) The facility shall be equipped with an automatic membrane integrity test system.

(4) The Executive Secretary shall establish the turbidity limit for 95% of turbidity measurements and the maximum turbidity limit which shall not be exceeded. The plant effluent shall meet the requirements of R309-200-5(5)(a)(ii).

R309-530-9. New Treatment Processes or Equipment.

The policy of the Board is to encourage, rather than to obstruct, the development of new methods and equipment for the treatment of water. Nevertheless, any new processes or equipment must have been thoroughly tested in full-scale, comparable installations, before approval of plans can be issued. Refer to EPA's Environmental Technology Verification Program (ETV).

No new treatment process will be approved for use in Utah unless the designer or supplier can present evidence satisfactory to the Executive Secretary that the process will insure the delivery of water of safe, sanitary quality, without imposing undue problems of supervision, operation and/or control.

The Executive Secretary shall establish the turbidity limit for 95% of turbidity measurements and the maximum turbidity limit which shall not be exceeded. The plant effluent shall meet the requirements of R309-200-5(5)(a)(ii).

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